

Report to the National Science Board
on the
National Science Foundation's
Merit Review Process
Fiscal Year 2014



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FY 2014 Report on the NSF Merit Review Process

I. Executive Summary

This annual report to the National Science Board (NSB) includes data and other information about the National Science Foundation (NSF or the Foundation) Merit Review Process for fiscal year (FY) 2014.

In FY 2014, NSF acted on 48,051 competitively reviewed full proposals. This is a decrease of about 1.9% from the number of proposals acted on in FY 2013. In FY 2012, two large divisions began requiring the submission of preliminary proposals for most programs within those divisions. The total number of full proposals and preliminary proposals acted on by NSF in FY 2014 (52,962) was 1.4% less than the total number of full proposals and preliminary proposals acted on in FY 2013 (53,690).

The Foundation made 10,958 awards in FY 2014, 129 (1.2%) more than in FY 2013. This corresponds to a 23% success rate for competitively reviewed proposals. As indicated by data in **Appendix 1**, the average funding rate varies by NSF directorate, from a low of 17% in Education and Human Resources to a high of 27 % in Biological Sciences.¹

In FY 2014, 81% of program funds awarded went to academic institutions.

FY 2014 saw a continuation of the recent emphasis on standard grants with 39% of funds being awarded as new standard grants compared to 10% as new continuing grants and 20% as continuing grant increments and supplements. In FY 2005, these numbers were 23%, 14%, and 29%, respectively.

The average number of months of salary support for individual Principal Investigators (PIs) or Co-PIs per research grant per year is now just over 0.8 months for single-PI awards and just under 0.8 months for multiple-PI awards. These numbers are comparable to the values in FY 2013. For single-PI awards they correspond to a hiatus in the decadal downward trend but for multiple-PI awards, that trend has extended another year. The running three-year mean number of research proposals a PI submitted before receiving an award remained 2.4 over the three-year period FY 2012 – FY 2014 and the moving three-year average PI success rate improved slightly to 36% from 35%. Among award recipients, the percentage of early-career PIs was 21% in FY 2014, similar to the decadal low seen in FY 2012.

Among proposals from PIs who provided information on their gender, race, ethnicity, or disability status, the proportion of proposals from PIs who identified themselves as female was 26%. The proportion of proposals from under-represented racial or ethnic minorities was 8.2% and the proportion from PIs with a disability was 1.4%.

¹ The Office of International and Integrative Activities is not included in this comparison.

The Foundation exceeded its “time to decision” goal of informing at least 70% of PIs of funding decisions within six months of receipt of their proposals. In FY 2014, 72% of all proposals were processed within six months.

Proposals that are externally reviewed are reviewed by three methods: panel only, mail + panel, and mail only. In FY 2014, 64% of proposals were reviewed by panel only, 26% by mail + panel, and 6% by mail only. These percentages are consistent with the trend over the last 15 years towards greater reliance on panels. In addition, about 4% of proposals were not reviewed externally. The latter include, for example, proposals for travel, symposia, EARly Concept Grants for Exploratory Research (EAGER), Grants for Rapid Response Research (RAPID), and Integrated NSF Support Promoting Interdisciplinary Research and Education (INSPIRE) Track 1 proposals.

II. Introduction

The National Science Foundation Act of 1950 directs the Foundation "to initiate and support basic scientific research and programs to strengthen scientific research potential and science education programs at all levels."² NSF achieves its unique mission by making merit-based awards to researchers, educators, and students at over 1,800 U.S. colleges, universities and other institutions.

All proposals are evaluated using the two NSB-approved criteria: *intellectual merit* and *broader impacts*. These are stated in the *NSF Grant Proposal Guide*. The language describing the merit review criteria in the *Grant Proposal Guide* was revised in October 2012 to incorporate new recommendations from the National Science Board. This revised language applied to proposals submitted on or after January 14, 2013, or in response to deadlines that were on or after January 14, 2013.³ Additional criteria, as stated in the program announcement or solicitation, may be required to highlight the specific objectives of certain programs or activities. About 96% of NSF's proposals are evaluated by external reviewers as well as by NSF staff. The remaining proposals fall into special categories that are, by NSF policy, exempt from external review and may be internally reviewed only, such as proposals for small workshops, EARly-concept Grants for Exploratory Research (EAGERs), Grants for Rapid Response Research (RAPIDs), and some proposals to the Integrated NSF Support Promoting Interdisciplinary Research and Education (INSPIRE) activity⁴ (see **Section III.F9** and **Appendix 11**).

This *FY 2014 Report on the NSF Merit Review Process* responds to a National Science Board (NSB) policy, endorsed in 1977 and amended in 1984, requesting that the NSF Director submit an annual report on the NSF merit review process. **Section III** of the report provides summary data about proposals, awards, and funding rates. Longitudinal data are given to provide a perspective over time. **Section IV** provides information about the process by which proposals are reviewed and awarded.

NSF's annual portfolio of funding actions (award or decline) is associated with proposals, requests for supplements, Intergovernmental Personnel Act agreements, and contracts. The bulk of this report deals with two overlapping subsets of these actions. Most of **Section III.A – E** looks at competitively reviewed proposals. **Section III.F** primarily discusses research proposals. The research proposal category includes proposals for what could be considered a typical research project and consists of a large subset (81%) of the competitively reviewed proposals.

In this document, two types of average are reported, the median and the arithmetic mean. The latter will be referred to simply as the mean. Funding rate and proposal success rate are used

² 42 CFR 16 §1862, available at http://www4.law.cornell.edu/uscode/html/uscode42/usc_sec_42_00001862----000-.html. [Accessed 10.26.2012.]

³ The *NSF Grant Proposal Guide* (GPG) applicable from October 1, 2013 to February 23rd, 2014 is available at: http://www.nsf.gov/pubs/policydocs/pappguide/nsf13001/gpg_index.jsp. The version of the GPG applicable for the remainder of FY 2014 may be found at: <http://www.nsf.gov/pubs/policydocs/pappguide/nsf14001/gpgprint.pdf>.

⁴ In FY 2012, NSF inaugurated the Integrated NSF Support Promoting Interdisciplinary Research and Education (INSPIRE) activity. See **Section III.F9.2**.

interchangeably to refer to the proportion of proposals acted on in a fiscal year that resulted in awards.

Directorates are often referred to by their acronyms BIO (Biological Sciences), CISE or CSE (Computer and Information Science and Engineering), EHR (Education and Human Resources), ENG (Engineering), GEO (Geosciences), MPS (Mathematical and Physical Sciences), and SBE (Social, Behavioral and Economic Sciences). Some tables and figures include data pertaining to the Office of International and Integrative Activities⁵, abbreviated as IIA. Acronyms for three units that existed in some of the years prior to FY 2014 are mentioned in the text of the report: OPP (Office of Polar Program), OCI (Office of Cyberinfrastructure), and OISE or ISE (Office of International Science and Engineering). A list of acronyms may be found in **Appendix 22**.

⁵ Effective April 6th, 2015, the Section for International Science and Engineering within the Office of International and Integrative Activities became a staff office, the Office of International Science and Engineering (OISE), within the Office of the Director (O/D Memorandum 15-09). With this change, the name of what had been known as the Office of International and Integrative Activities (IIA) reverted to the Office of Integrative Activities (OIA). Since this report pertains to Fiscal Year (FY) 2014, the text, tables and figures within it reflect the nomenclature in effect during FY 2014.

III. Proposals and Awards

A. Proposals, Awards, and Proposal Success Rates

Table 1 shows the change in the number of proposals, number of awards, and proposal success rates through time. These data are for all competitively reviewed proposals.⁶ The reader may also be interested in success rates for research proposals which may be found in **Section III.F**. Note that a proposal is included in a given year based on whether the action (division director's recommendation to award or decline⁷) was taken that year, not whether the proposal was received in that year.

In this, and many subsequent tables, results for FY 2009 and FY 2010 include funding actions made possible by the \$3 billion additional appropriation that NSF received under the American Recovery and Reinvestment Act (ARRA). Approximately \$2.5 billion of the ARRA appropriation was obligated in FY 2009. The remainder was obligated in FY 2010, primarily as facilities awards.

NSF completed action on 48,051 proposals in FY 2014, a 1.9% decrease from FY 2013, resulting in 10,958 awards, a 1.2% increase from FY 2013. Consequently, in FY 2014 the proposal success rate was 23%. Over the five years FY 2010 to FY 2014, the success rate has been relatively stable, remaining between 22% and 24%. **Appendix 1** provides proposal, award, and success rate data by NSF directorate and office.

Table 1 - NSF Proposal, Award, and Proposal Success Rate Trends

	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014
Proposals	31,942	35,165	40,075	43,851	41,722	42,352	44,577	44,428	45,181	55,542	51,562	48,613	48,999	48,051
Awards	9,925	10,406	10,844	10,380	9,757	10,425	11,463	11,149	14,595	12,996	11,192	11,524	10,829	10,958
Success Rate	31%	30%	27%	24%	23%	25%	26%	25%	32%	23%	22%	24%	22%	23%

Source: NSF Enterprise Information System, 10/01/14.

In addition to the full proposals in **Table 1**, in FY 2014 NSF also acted on 4,911 preliminary proposals, which are required for some NSF programs. See **Appendix 2** for additional data and information on preliminary proposals.

⁶ The category of actions associated with "competitively reviewed proposals," excludes actions on preliminary proposals, contracts, IPA agreements, continuing grant increments, Graduate Research Fellowships, and similar categories.

⁷ The merit review process is managed by NSF's program units (divisions and offices) and is completed when the division director or office head concurs with a program officer's recommendation to award or decline a proposal. For simplicity, this step will be referred to as completion of an award or decline action on a proposal. If that action is to recommend that an award be made, further processing takes place within the Office of Budget and Financial Administration before an award is issued by NSF. More details may be found in **Section IV.B**.

B. Diversity of Participation

To advance the goals described in NSF's Strategic Plan, one of the core strategies described is broadening the participation in NSF's activities by members of groups that are currently under-represented in STEM disciplines. This includes ensuring the participation of researchers, educators and students from under-represented groups in NSF's programs as well as preparing and engaging a diverse STEM workforce, motivated to participate at the frontiers of research and education.

Table 2 provides data on proposal, award, and success rates by PI characteristics (gender, under-represented ethnic or racial group, disability, new and prior PI status). Gender, disability, and ethnic or racial data are based on self-reported information in proposals. About 88% of PIs provided gender information and 90% provided some ethnic or racial information. (89% of proposals were from PIs who provided gender information⁸, 91% were from PIs who provided race or ethnicity information⁹, and 70% were from PIs who provided information about disability status.) The under-represented ethnic/racial PIs category in **Table 2** includes American Indian /Alaska Native, Black/African American, Hispanic or Latino, and Native Hawaiian/Pacific Islander but excludes Asian and White-Not of Hispanic Origin.

Table 2 - Competitively Reviewed Proposals, Awards and Proposal Success Rates by PI Characteristics

		2001	2006	2007	2008	2009	2010	2011	2012	2013	2014
All PIs	Proposals	31,942	42,352	44,577	44,428	45,181	55,542	51,562	48,613	48,999	48,051
	Awards	9,925	10,425	11,463	11,149	14,595	12,996	11,192	11,524	10,829	10,958
	<i>Omnibus</i>					9,975	12,547				
	ARRA					4,620	449				
	Funding Rate	31%	25%	26%	25%	32%	23%	22%	24%	22%	23%
Female PIs	Proposals	5,839	8,510	9,197	9,431	9,727	11,903	11,488	10,795	11,152	11,142
	Awards	1,894	2,233	2,493	2,556	3,297	2,982	2,602	2,775	2,556	2,669
	<i>Omnibus</i>					2,247	2,887				
	ARRA					1,050	95				
	Funding Rate	32%	26%	27%	27%	34%	25%	23%	26%	23%	24%
Male PIs	Proposals	25,510	31,482	32,650	32,074	32,091	38,695	35,211	32,932	32,866	31,625
	Awards	7,867	7,765	8,451	7,986	10,437	9,080	7,739	7,816	7,316	7,286
	<i>Omnibus</i>					7,169	8,760				
	ARRA					3,268	320				
	Funding Rate	31%	25%	26%	25%	33%	23%	22%	24%	22%	23%
PIs from under-represented racial or ethnic groups	Proposals	1,728	2,608	2,798	2,762	2,945	3,613	3,441	3,291	3,303	3,268
	Awards	509	638	713	670	889	812	735	718	651	681
	<i>Omnibus</i>					649	790				
	ARRA					240	22				
	Funding Rate	29%	24%	25%	24%	30%	22%	21%	22%	20%	21%

⁸ As a group, the success rate for PIs who do not indicate their gender tends to be consistently lower than PIs that do. For example, in FY 2014, the success rate for PIs whose gender was not known was 19%.

⁹ However, for only 83% of proposals was the information sufficient to determine whether or not the PI belonged to an under-represented racial or ethnic group. (Some report only one of race or ethnicity; some report "Unknown.")

		2001	2006	2007	2008	2009	2010	2011	2012	2013	2014
New PIs <i>Former Definition</i>	Proposals	13,280	18,061	18,971	18,989	19,044	24,116	21,703	20,174	19,905	19,669
	Awards	3,136	3,240	3,660	3,622	4,706	4,024	3,322	3,408	3,327	3,448
	<i>Omnibus ARRA</i>					2,967	3,868				
	Funding Rate	24%	18%	19%	19%	25%	17%	15%	17%	17%	18%
New PIs <i>Revised Definition¹⁰</i>	Proposals	11,872	15,877	16,445	16,483	16,840	21,545	19,238	17,943	17,635	17,405
	Awards	2,702	2,842	3,151	3,132	4,174	3,620	2,976	3,063	3,013	3,108
	<i>Omnibus ARRA</i>					2,613	3,487				
	Funding Rate	23%	18%	19%	19%	25%	17%	15%	17%	17%	18%
Prior PIs <i>Former Definition</i>	Proposals	18,662	24,294	25,606	25,439	26,137	31,426	29,835	28,439	29,094	28,385
	Awards	6,789	7,185	7,803	7,527	9,889	8,972	7,849	8,116	7,502	7,513
	<i>Omnibus ARRA</i>					7,008	8,679				
	Funding Rate	36%	30%	30%	30%	38%	29%	26%	29%	26%	26%
Prior PIs <i>Revised Definition</i>	Proposals	19,569	26,172	27,660	27,424	28,341	33,997	32,324	30,670	31,364	30,646
	Awards	6,947	7,475	8,202	7,892	10,421	9,376	8,216	8,461	7,816	7,850
	<i>Omnibus ARRA</i>					7,362	9,060				
	Funding Rate	36%	29%	30%	29%	37%	28%	25%	28%	25%	26%
PIs with Disabilities	Proposals	409	434	448	448	470	545	543	483	488	468
	Awards	115	107	104	109	149	108	107	134	122	99
	<i>Omnibus ARRA</i>					105	105				
	Funding Rate	28%	25%	23%	24%	32%	20%	20%	28%	25%	21%

Source: NSF Enterprise Information System, 10/01/14.

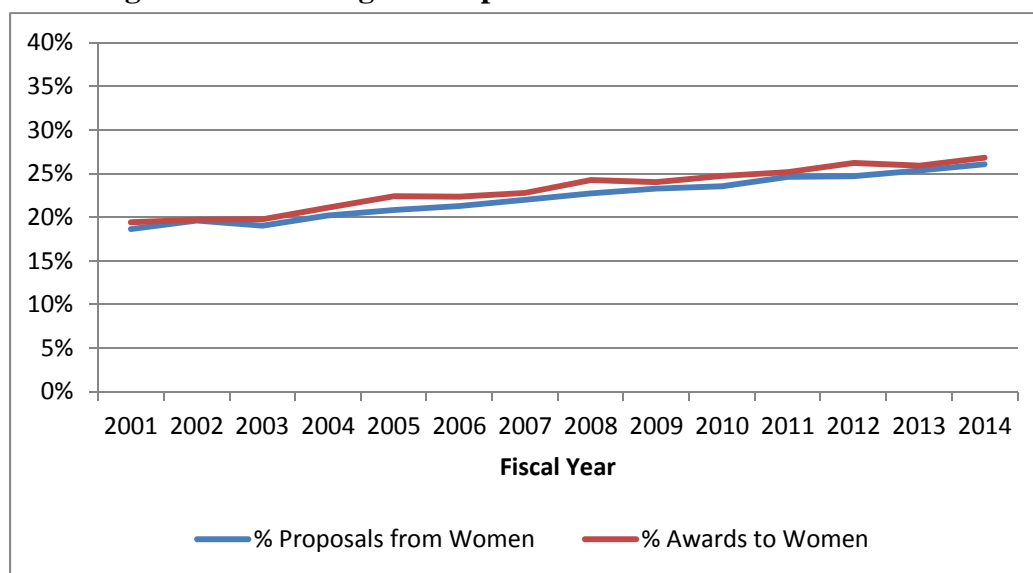
Gender

In general, while fewer proposals are received from women than men, the success rate for female PIs is slightly higher than that for male PIs. The proportion of proposals from female PIs was 26.1% in FY 2014.¹¹ As may be seen in **Figure 1**, over the past decade, there has been a relatively steady, if slow, rate of increase in the proportion of proposals that are submitted by women and a corresponding upward trend in the proportion of awards that are made to women. Since the success rate for women exceeds that for men, the proportion of awards to women is always slightly higher than the proportion of proposals from women.

¹⁰ In FY 2009, in conjunction with NSF's implementation of the American Recovery and Reinvestment Act, NSF revised its definition of a new PI which became, "A new PI is an individual who has not served as the PI or Co-PI on any award from NSF (with the exception of doctoral dissertation awards, graduate or post-doctoral fellowships, research planning grants, or conferences, symposia and workshop grants.)" Previously, a new PI was considered to be any individual who had not previously been a PI on any NSF award.

¹¹ This is calculated as a percentage of the number of proposals from PIs who provided information about gender. The proportions for PIs from other under-represented groups are calculated similarly except that, in **Figure 2**, the number of PIs who provided information sufficient to determine whether they belong to an under-represented racial or ethnic group has been estimated for the years FY 2001 – FY 2009, by using the same fraction of PIs as was found in FY 2010. Based on fluctuations seen in FY 2010 – FY 2013, it is estimated that this may introduce errors in the percentages of proposals and awards from under-represented racial or ethnic groups that have an absolute magnitude of less than 0.05%, much less than the variation seen in **Figure 2**. Data in **Figure 3** are treated in a similar way.

Figure 1 - Percentage of Proposals from and Awards to Women

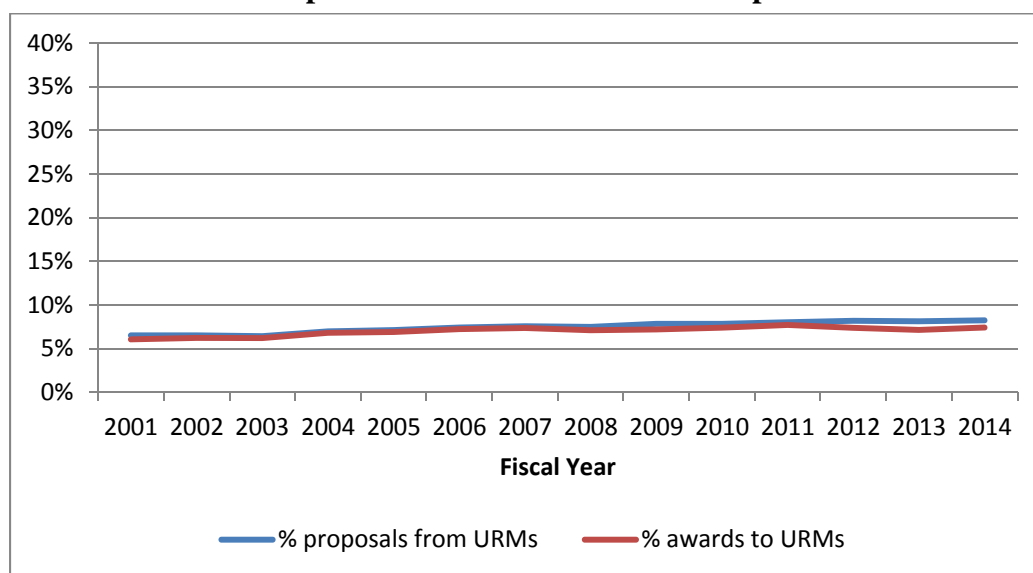


Source: NSF Enterprise Information System, 10/01/14.

Under-represented Racial or Ethnic Groups

The success rate for PIs from under-represented racial or ethnic groups (URMs) is lower than the average success rate over all PIs. The proportion of proposals from such PIs remains low (see **Figure 2**) but the number of proposals from such PIs has grown more rapidly than the total number of proposals submitted to NSF.

Figure 2 - Percentage of Proposals from and Awards to Researchers from Under-represented Racial or Ethnic Groups



Source: NSF Enterprise Information System, 10/01/14.

Between FY 2001 and FY 2014, the average rate of increase in proposals from PIs from under-represented racial or ethnic groups was approximately 53% greater than the average rate of

increase in the total number of proposals. Compared to the preceding years, in the past three years, the success rate of minority PIs has been anomalously low compared to the overall success rate. The three-year average of the ratio of the two success rates was 91% in FY 2012 – 2014 compared to 98% for FY2002 – FY 2004.

Table 3 provides data on proposal, award and success rates by PI race and ethnicity.

Table 3 – Competitively Reviewed Proposals, Awards and Success Rates, by PI Race and Ethnicity¹²

		2005	2006	2007	2008	2009	2010	2011	2012	2013	2014
American Indian/Alaska Native	Proposals	112	112	97	91	88	118	129	83	113	103
	Total Awards	30	32	32	23	29	28	36	18	28	36
	<i>Omnibus</i>					20	28				
	ARRA					9	0				
	Funding Rate	27%	29%	33%	25%	33%	24%	28%	22%	25%	35%
Black/ African American	Proposals	842	915	1,034	997	1,022	1,280	1,201	1,154	1,124	1,123
	Total Awards	199	201	240	246	298	270	243	263	203	204
	<i>Omnibus</i>					233	262				
	ARRA					65	8				
	Funding Rate	24%	22%	23%	25%	29%	21%	20%	23%	18%	18%
Native Hawaiian/ Pacific Islander	Proposals	27	28	26	30	23	38	42	40	32	30
	Total Awards	5	9	6	8	8	10	11	6	5	5
	<i>Omnibus</i>					5	8				
	ARRA					3	2				
	Funding Rate	19%	32%	23%	27%	35%	26%	26%	15%	16%	17%
Asian	Proposals	7,368	7,916	8,801	8,952	9,550	11,626	10,829	10,382	10,511	10,538
	Total Awards	1,302	1,530	1,801	1,780	2,465	2,124	1,907	1,914	1,887	1,925
	<i>Omnibus</i>					1,691	2,071				
	ARRA					774	53				
	Funding Rate	18%	19%	20%	20%	26%	18%	18%	18%	18%	18%
White	Proposals	29,928	29,861	30,676	30,217	29,975	36,153	33,200	30,596	30,766	29,624
	Total Awards	7,564	7,885	8,499	8,153	10,499	9,306	7,826	8,020	7,372	7,390
	<i>Omnibus</i>					7,144	8,958				
	ARRA					3,355	348				
	Funding Rate	25%	26%	28%	27%	35%	26%	24%	26%	24%	25%
Multiracial	Proposals	322	301	279	284	337	512	433	448	439	425
	Total Awards	87	78	81	76	112	118	99	113	110	114
	<i>Omnibus</i>					80	112				
	ARRA					32	6				
	Funding Rate	27%	26%	29%	27%	33%	23%	23%	25%	25%	27%

¹² This table differs from a similar one included in reports for years up to FY 2011. Before FY 2012, individuals who identified a race and indicated that they were Hispanic or Latino were only counted in the Hispanic or Latino category. Beginning in FY 2012, such individuals are included in both the appropriate racial group and in Hispanic or Latino. Previously, except for those who were Hispanic or Latino, individuals who identified multiple races were not included in the table. A “multiracial” category has been added to the table.

		2005	2006	2007	2008	2009	2010	2011	2012	2013	2014
Hispanic or Latino	Proposals	1,471	1,525	1,639	1,611	1,755	2,092	2,019	1,934	1,956	1,921
	Total Awards	324	378	433	382	533	476	438	412	401	411
	<i>Omnibus</i> <i>ARRA</i>					373	465				
	Funding Rate	22%	25%	26%	24%	30%	23%	22%	21%	21%	21%

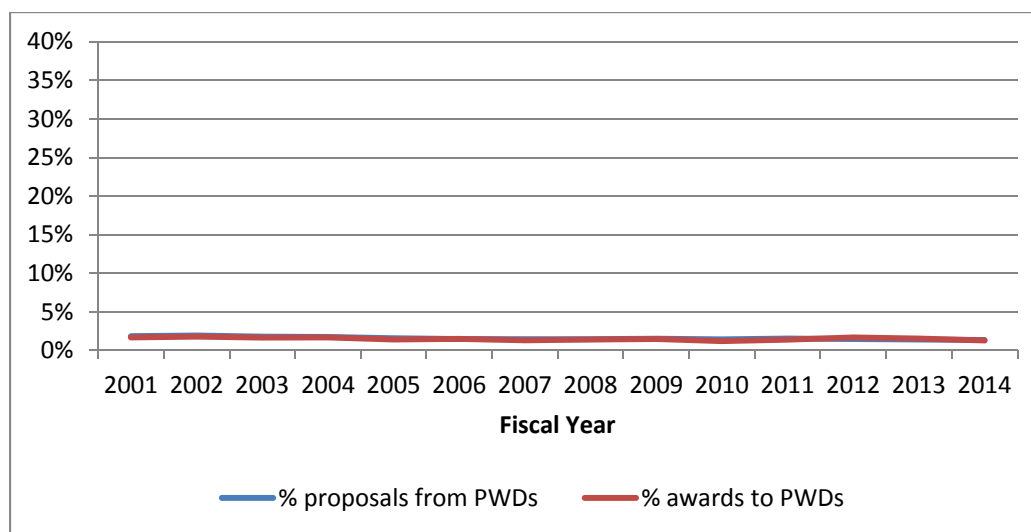
Source: NSF Enterprise Information System, 10/01/14.

Very few PIs identify themselves as belonging to the categories American Indian/Alaska Native or Native Hawaiian/Pacific Islander. Because of the small numbers involved, the year-to-year fluctuations in success rates for these groups tend to be greater than for other ethnic groups. The proportion of submissions from under-represented racial and ethnic groups in FY 2014 (8.2%¹³) is smaller than their representation in the U.S. population but is similar to their representation in the full-time faculty of academic institutions (8.3%¹⁴). Among racial and ethnic groups that submitted more than 1,000 proposals in FY 2014, the success rate is highest for the groups White (25%) and Hispanic or Latino (21%). It is lowest for Asian (18%) and Black/African American (18%). **Appendix 3** provides proposal, award, and funding rate information by PI race, ethnicity and gender, by directorate.

PIs with a Disability

The proposal success rate for PIs identifying themselves as having a disability has remained comparable to the overall success rate for all PIs (**Table 2**), being slightly lower than the all-PI success rate for most of FY 2005 - FY 2014 but slightly higher in FY 2012 and FY 2013.

Figure 3 - Percentage of Proposals from and Awards to PIs with a Disability (PWDs)



Source: NSF Enterprise Information System, 10/01/14.

¹³ The ratio of the number of PIs in an under-represented racial or ethnic minority to the total number of PIs who provided sufficient information to determine whether or not they belonged to such a minority.

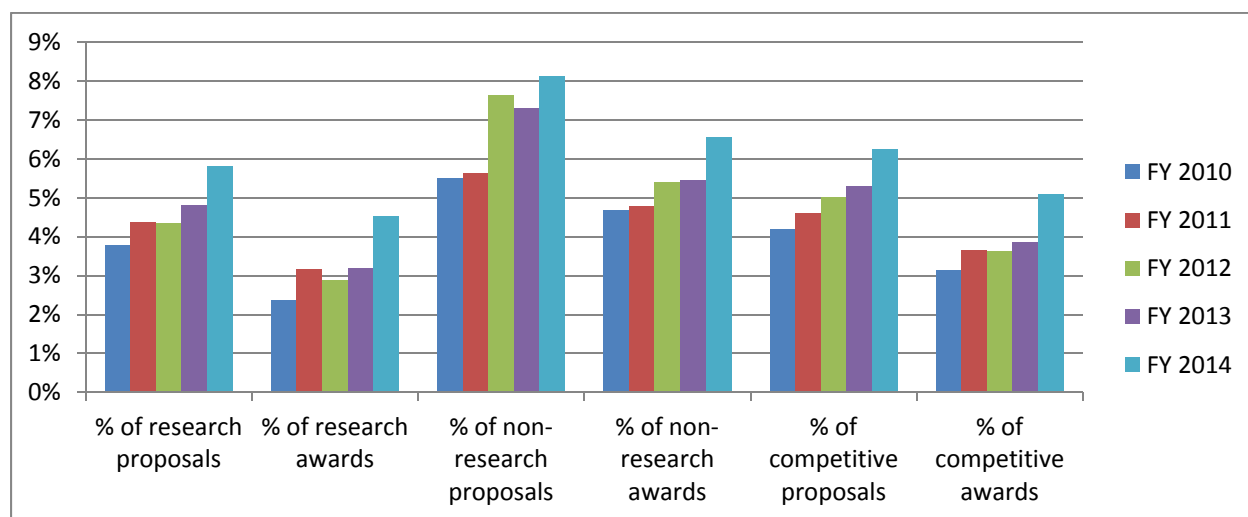
¹⁴ Data for full-time faculty members of institutions of higher education who hold doctorates in physical sciences, mathematics, computer sciences, life sciences, psychology, social sciences, or engineering. Available at www.nsf.gov/statistics/seind14/content/chapter-5/at05-16.xls ("Science and Engineering Indicators 2014.")

Unlike women and under-represented racial and ethnic groups, the proportion of proposals that come from researchers with disabilities has not grown from FY 2001 to FY 2014 (**Figure 3**). Instead, it has declined from approximately 1.9% in FY 2002 to approximately 1.4%¹⁵ in FY 2014.

Minority-Serving Institutions

Figure 4 shows the proportion of proposals from and awards to minority-serving institutions¹⁶ (MSIs) in recent years.

Figure 4 –Proposals from and Awards to MSIs, by Fiscal Year and Proposal Category¹⁷



Source: NSF Enterprise Information System, 10/01/10, 10/01/11, 10/01/12, 10/01/13, 10/01/14.

Although the proportion of competitive proposals that come from minority-serving institutions is low, it increased noticeably from FY 2013 to FY 2014. The proportion of research awards going to minority-serving institutions also increased, going from 3.2% to 4.5%.

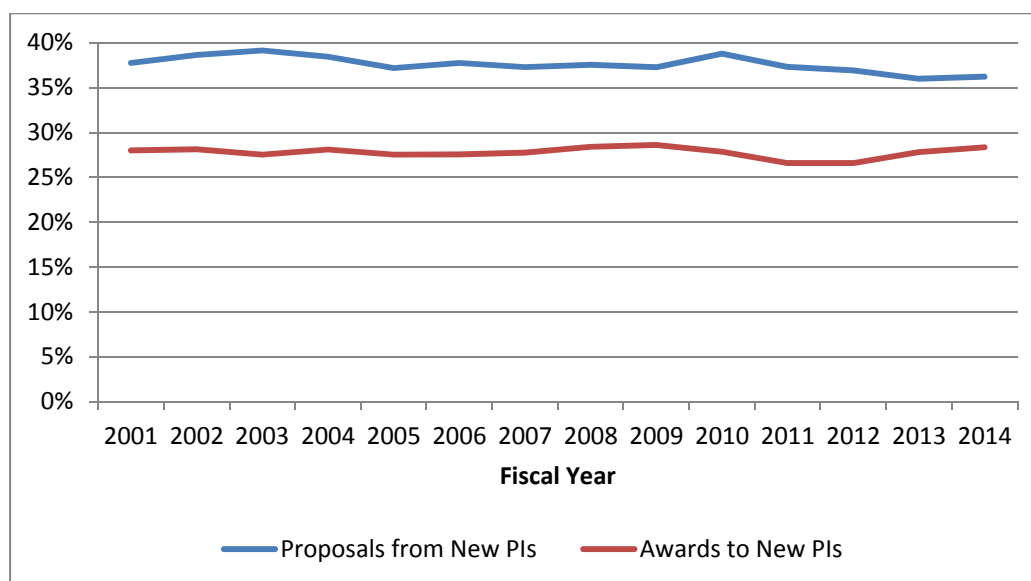
New PIs

The success rate for PIs who have not previously had an NSF award is lower than that for PIs who have previously submitted a successful NSF proposal (18% compared to 26%; see **Table 2**). In FY 2014, the proportion of proposals from new PIs was 36% (**Figure 5**). Since FY 2001, this number has fluctuated between approximately 36% and 39%. Since FY 2010, the proportion of proposals from new PIs declined from 39% to 36%. **Appendix 4** provides funding rates by new PI and prior PI status, by directorate. Averaged over FY 2004–2014, new PIs are least successful relative to prior PIs in MPS and SBE, and most successful in CISE and ENG.

¹⁵ In FY 2014, approximately 70% of competitively reviewed proposals were from PIs who indicated whether or not they had a disability. Of these, 1.4% reported that they did have a disability.

¹⁶ These are institutions reported as Historically Black Colleges and Universities, Hispanic-Serving Institutions, or Tribal Colleges and Universities.

¹⁷ Research proposals are defined at the beginning of **Section III.F**. Non-research proposals are those competitive proposals that are not research proposals. For each year, the data are for institutions that were MSIs at the end of the respective fiscal year. In the FY 2013 report, data were based on the status of institutions at the end of FY 2013.

Figure 5 - Percentage of Proposals from and Awards to New PIs

Source: NSF Enterprise Information System, 10/01/14.

There has been a slight uptick in the proportion of awards going to new PIs in both FY 2013 and FY 2014 (**Figure 5**). In FY 2013 this was primarily due to a decline in the success rate of prior PIs from FY 2012 to FY 2013 while the success rate of new PIs remained relatively constant at 17.1% in both years. In FY 2014, the success rate of both new PIs and prior PIs increased slightly.

C. Types of Awards

NSF uses three kinds of funding mechanisms: grants, cooperative agreements, and contracts. Most of NSF's projects support or stimulate scientific and engineering research and education, and are funded using grants or cooperative agreements. A grant is the primary funding mechanism used by NSF. A grant may be funded as either a standard award (in which funding for the full duration of the project, generally 1-5 years, is awarded in a single fiscal year) or a continuing award (in which funding of a multi-year project is provided in, usually annual, increments).

The use of standard and continuing grants allows NSF flexibility in balancing current and future obligations, and managing funding rates. For continuing grants, the initial funding increment is accompanied by a statement of intent to continue funding the project in subsequent increments (called "continuing grant increments" or CGIs)¹⁸ until the project is completed. The continued funding is subject to NSF's judgment of satisfactory progress, availability of funds, and receipt and approval of required annual reports. As shown below in **Table 4**, in FY 2014, NSF devoted 39% of its total budget to new standard grants and 10% to new continuing grants. Cooperative agreements are used when the project requires substantial agency involvement during the project performance period (e.g., research centers and multi-user facilities). Contracts are used to

¹⁸ While the original award is a competitive action, the continuing grant increment is a non-competitive grant.

acquire products, services and studies (e.g., program evaluations) required primarily for NSF or other government use.

Table 4 - Percentage of NSF Funding by Type of Award

CATEGORY	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014
Standard Grants	23%	25%	26%	28%	44%	37%	34%	35%	35%	39%
New Continuing	14%	13%	14%	13%	8%	13%	11%	11%	12%	10%
CGIs and Supplements	29%	28%	26%	26%	18%	18%	23%	22%	22%	20%
Cooperative Agreements	24%	23%	22%	23%	21%	23%	23%	23%	23%	22%
Other	10%	11%	11%	11%	9%	9%	9%	10%	8%	8%

Source: NSF Enterprise Information System, 10/4/14. Percentages may not sum to 100 due to rounding.

ARRA awards were generally made as standard grants. “Other” includes contracts, fellowships, interagency agreements, and IPA agreements.

D. Awards by Sector/Institution

In FY 2014, of the program funds awarded by NSF, approximately 81% went to academic institutions, 11% to non-profit and other organizations, 5% to for-profit businesses, and 3% to Federal agencies and laboratories. As shown in **Table 5**, the proportion awarded to academic institutions remains at its highest level in the past decade.

Table 5 - Distribution of Funds by Type of Organization

Sector/Institution	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014
Academic Institutions	76%	76%	76%	76%	76%	77%	77%	80%	81%	81%
Non-Profit and Other Organizations	15%	15%	15%	13%	13%	11%	13%	12%	11%	11%
For-Profit	7%	7%	7%	8%	6%	6%	6%	5%	6%	5%
Federal Agencies and Laboratories	2%	2%	3%	3%	4%	5%	5%	3%	3%	3%

Source: NSF Enterprise Information System, 11/5/14. Percentages may not sum to 100 due to rounding.

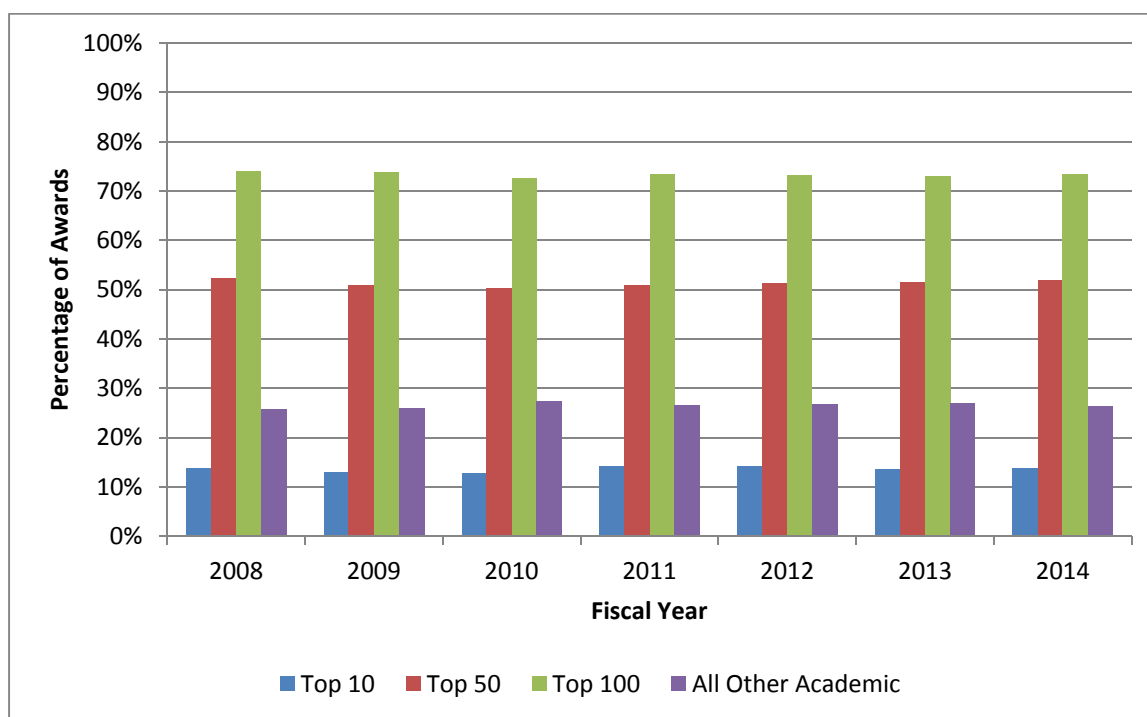
Figure 6 shows how funds to academic institutions are distributed. Academic institutions are categorized according to the proportion of NSF funding received (i.e., grouping those receiving the largest proportion of NSF funding – the top 10, 50, and 100 academic institutions).

The Foundation tracks proposal success rates¹⁹ for different types of academic institutions. For FY 2014, the average proposal success rate was 25% for the top 100 Ph.D.-granting institutions (classified according to the amount of FY 2014 funding received). In comparison, the rate was 16% for Ph.D.-granting institutions that are not in the top 100 NSF-funded category. The proposal success rate was 21% for both four-year institutions and two-year institutions in FY 2014. For minority-serving institutions, the FY 2014 proposal success rate was 19%.

¹⁹ This report uses the term “proposal success rate” to refer to the rate at which submitted proposals are successful in obtaining funding. For example, if a program processed 200 proposals in the year, making 50 awards and declining the remaining 150, then the “proposal success rate” for that program in that year would be 25%.

The Foundation promotes geographic diversity in its programs. For example, the mission of the Experimental Program to Stimulate Competitive Research (EPSCoR) is to assist the NSF in its statutory function “to strengthen research and education in science and engineering throughout the United States and to avoid undue concentration of such research and education.”²⁰

Figure 6 - Percentage of Awards to Academic Institutions (By Amount Received)



Source: NSF Enterprise Information System, 10/01/14.

The EPSCoR program was designed for those jurisdictions that have historically received lesser amounts of NSF Research and Development funding. In FY 2014, 28 states, the Commonwealth of Puerto Rico, the U.S. Virgin Islands and Guam were eligible to participate in aspects of the program. For three of the 28 states, Iowa, Tennessee, and Utah, the prior 3-year rolling average of NSF research funds received was over 0.75% of NSF’s Research and Related Activities budget and these jurisdictions were not eligible to participate in new Research Infrastructure Improvement initiatives in FY 2014. **Appendix 5** provides data on proposals, awards, and proposal success rates for the EPSCoR jurisdictions.

NSF made a number of outreach presentations to institutions across the country in an effort to help increase their participation and success in NSF programs:

- One Grants Conference was held in FY 2014. This was organized by the NSF Policy Office. It was held in Denver, Colorado and hosted by the Colorado State University.

²⁰ 42 CFR 16 §1862, http://www4.law.cornell.edu/uscode/html/uscode42/usc_sec_42_00001862----000-.html.

- Two “NSF Days,” organized by the Office of Legislative and Public Affairs, were held during FY 2014 in New York and Maryland.

Representatives from most of NSF’s directorates and offices attended these conferences. They held separate focus sessions on program opportunities in specific disciplines in addition to providing general information about proposal preparation and the merit review process.

As in prior years, NSF hosted informational booths at scientific meetings such as the annual meeting of the American Association for the Advancement of Science. NSF participated in the USA Science and Engineering Festival. In addition to these, outreach workshops were sponsored by several of the individual NSF directorates, as well as by EPSCoR and other NSF-wide programs. Some programs and offices, for example, the Exploiting Parallelism and Scalability program, the Cyber-Physical Systems program and the Division of Advanced Cyberinfrastructure, held webinars for people interested in learning more about the programs involved. Finally, program officers frequently conduct outreach when visiting institutions or participating in scientific meetings. NSF outreach to scientists and engineers from under-represented groups also includes activities such as attendance at workshops for tribal colleges and other minority-serving institutions.

E. Time to Decision (Proposal Dwell Time)

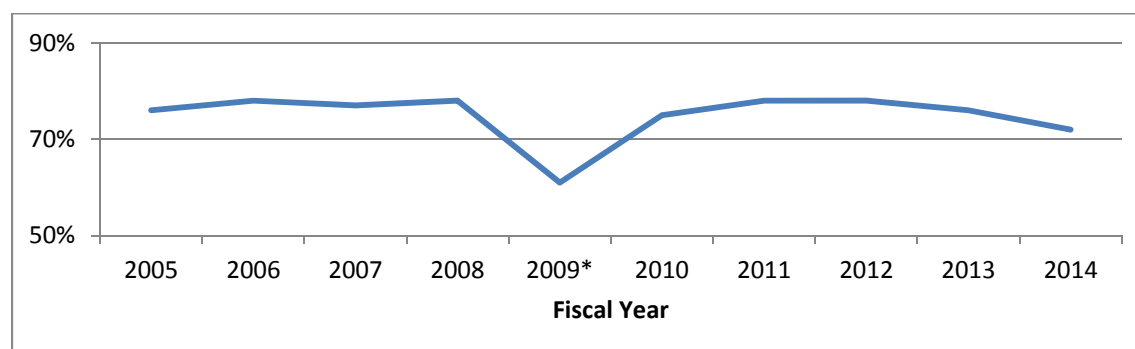
It is important for applicants to receive a timely funding decision. The Foundation’s FY 2014 Government Performance and Results Act performance goal calls for informing at least 70% of PIs of funding decisions (i.e., award or decline) within six months of the proposal deadline, target date, or receipt date, whichever is later. In 2014, NSF exceeded the dwell time goal with 72% of applicants informed within 6 months. NSF has consistently exceeded this goal with the exception of FY 2009. In FY 2009, the NSF dwell time performance measure was suspended for the last three quarters to delay processing proposals that would have been declined due to lack of funding. This enabled some of these proposals to be funded with the ARRA appropriation.

Table 6 - Proposal Dwell Time: Percentage of Proposals Processed Within 6 Months

2005	2006	2007	2008	2009*	2010	2011	2012	2013	2014
76%	78%	77%	78%	61%	75%	78%	78%	76%	72%

Source: NSF Enterprise Information System, 10/01/14. *Dwell-time goal suspended in FY 2009.

Figure 7 - Percentage of Proposals Processed within 6 Months



F. Data on Research Grants

The purpose of this section is to provide data on what are referred to as “research grants.” The term research grant is used by NSF to represent what could be considered a typical research award, particularly with respect to the award size. Education research grants are included. Excluded are large awards such as centers and facilities, equipment and instrumentation grants, grants for conferences and symposia, grants in the Small Business Innovation Research program, Small Grants for Exploratory Research, and education and training grants.

F1. Research Proposal, Award, & Success Rate Trends

Table 7 provides the proposal, grant, and success rate trends for NSF research grants. The number of new awards made in FY 2014 (7,923) was 3.5% higher than what was possible in FY 2013 (7,652) and was accompanied by an increase in the mean annualized award size of 1.4%. The number of research proposals acted on decreased by 0.9% and the success rate for research proposals increased by 4.5%^{21,22}, partially offsetting the drop in success rate of 6.9% seen between FY 2012 and FY 2013. **Appendix 6** shows the numbers of research proposals received and success rates broken out by NSF divisions.

Table 7 - Research Proposals, Award and Success Rate Trends

	2001	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014
Proposals	23,096	31,574	31,514	33,705	33,643	35,609	42,225	41,840	38,490	39,249	38,882
Awards	6,218	6,258	6,708	7,415	6,999	10,011	8,639	7,759	8,061	7,652	7,923
<i>Omnibus</i>						6,346	8,613				
<i>ARRA</i>						3,665	26				
Success Rate	27%	20%	21%	22%	21%	28%	20%	19%	21%	19%	20%

Source: NSF Enterprise Information System, 10/01/14.

F2. Research Grant Size and Duration

Adequate award size and duration are important for enabling science of the highest quality and ensuring that the proposed work can be accomplished as planned. Larger award size and longer award duration may also permit the participation of more students and allow investigators to devote a greater portion of their time to conducting research.

In FY 2014 the annualized median award size was \$133,318, a 2.6% increase from FY 2013 in nominal dollars and the annualized mean award amount was \$171,530, a 1.4% increase from FY 2013. The inflation-adjusted average annual award sizes are shown in **Figure 8**. In real (i.e., inflation-adjusted) dollars, the FY 2014 annualized mean award amount (\$171,530) was approximately equal to the FY 2013 amount (\$171,680)²³. The mean annual award size in

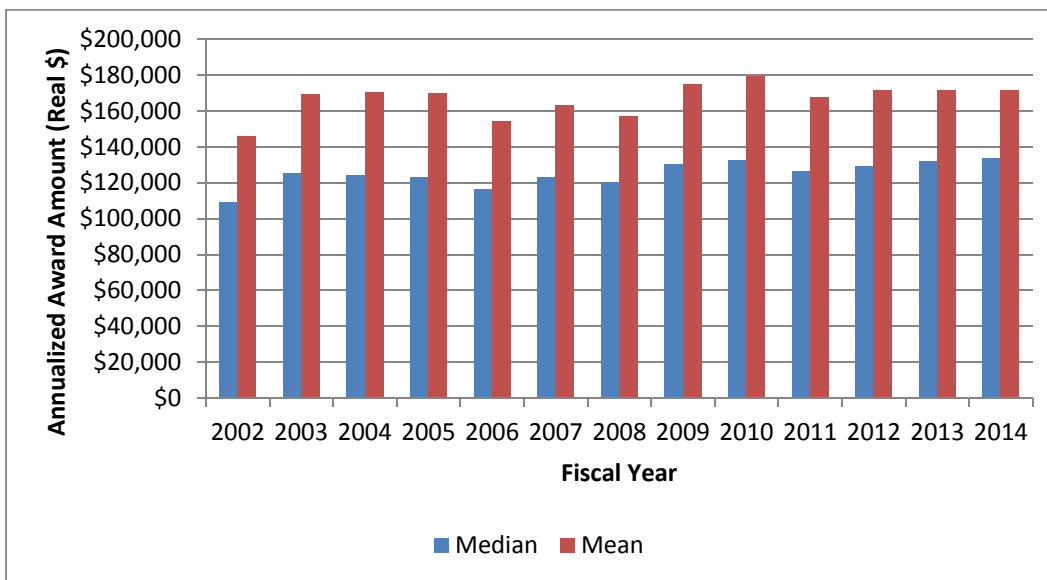
²¹ I.e., the ratio of success rates between FY 2014 and FY 2013 is 1.045 [= (7,923/38,882) ÷ (7,652/39,249)].

²² EAGER and RAPID proposals, which have a high success rate, are approximately 1.7% of the research proposals. If these are removed from the total, then the success rate for research proposals is reduced from 20.4% to 19.2%.

²³ Inflation-adjusted dollars were calculated using the Office of Management and Budget’s Gross Domestic Product (GDP) (chained) Price Index. This deflator is updated by the Office of Management and Budget and is based on the U.S. Government fiscal year, October 1 to September 30. For this section and **Figure 8**, FY 2014 is the reference year (one FY 2014 dollar equals one real dollar).

nominal dollars increased by 19.4% from FY 2005 to FY 2014. The mean annual award size in *real* dollars fluctuated but remained relatively steady over the same period. The ARRA appropriation made possible an increase in average annual award size in FY 2009 and FY 2010, relative to FY 2008. The ARRA appropriation also helped to reduce out-year commitments.

Figure 8 - Annualized Award Amounts for Research Grants in Real Dollars



*FY 2009 and FY 2010 include ARRA funding. Source: NSF Enterprise Information System, 10/01/14 and OMB Historical Table 10.1 "Gross Domestic Product and Deflators Used in the Historical Tables: 1940–2020", at <https://www.whitehouse.gov/sites/whitehouse.gov/files/omb/budget/fy2018/hist10z1.xls>, accessed on 02/13/15. Real dollars use FY 2014 as a baseline.

Data on award size and duration organized by NSF directorate for the last ten years are presented in **Appendix 7**. There is considerable variation between directorates; for example, BIO, CISE and GEO award larger grants on average, while ENG, MPS and SBE award smaller grants.

As **Table 8** shows, the average award duration has remained relatively constant.²⁴ Program officers must balance competing requirements, such as increasing award size, increasing duration of awards, or striving to maintain proposal success rates.

Table 8 - Mean Award Duration for Research Grants

	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014
Duration (Years)	2.9	2.9	3.0	3.0	2.9	2.9	3.0	3.0	2.9	2.9	2.9	3.0	3.0

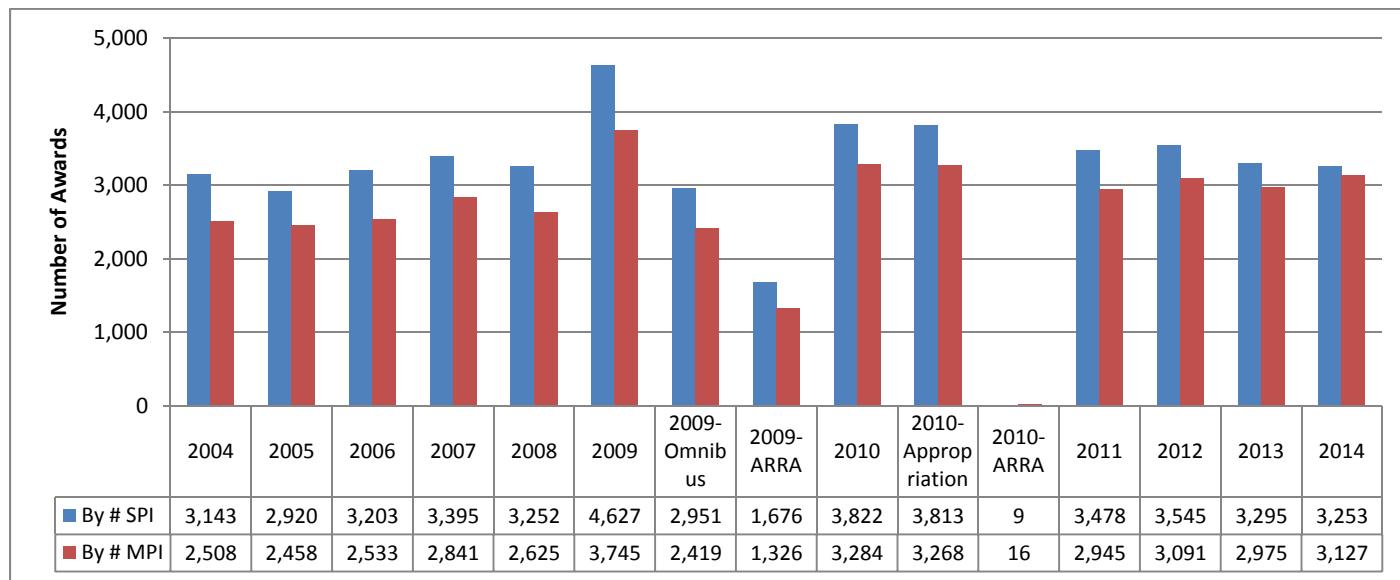
Source: NSF Enterprise Information System, 10/01/14.

²⁴ The number of years is rounded to one decimal place. 0.1 years represents about five weeks. This duration is the initial duration for new awards in each year and does not take into account no-cost extensions.

F3. Number of Investigators per Research Project

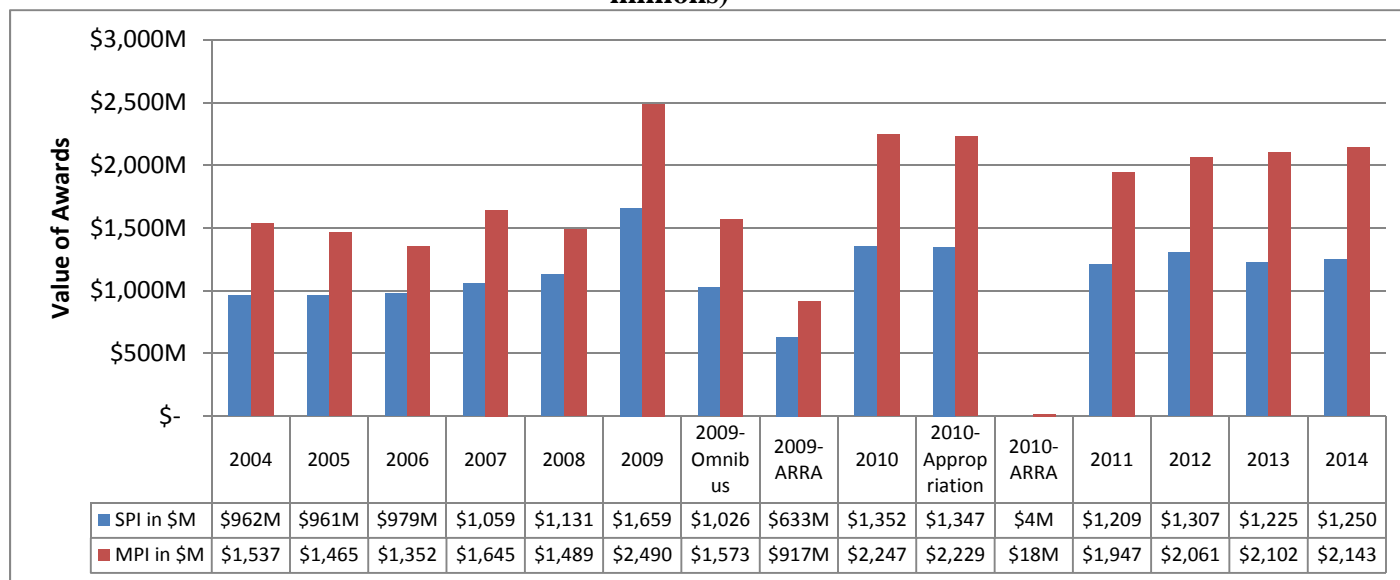
Figure 9 shows the number of new research projects with single PIs (SPI) compared to the number of research projects with multiple PIs (MPI). The number of SPI projects remains greater than the number of MPI projects. **Figure 10** indicates the total amount of funds awarded to SPI research projects in comparison to the amount of funds awarded to MPI research projects.

Figure 9 - Research Projects with Single PIs (SPI) & Multiple PIs (MPI), by Number



Source: NSF Enterprise Information System, 10/01/14. Note: In FY2010, a total of only 25 research projects were funded from the ARRA appropriation (including one collaborative project). These are barely visible in the figure.

Figure 10 - Research Projects with Single PIs (SPI) & Multiple PIs (MPI), by Dollar Amount (in millions)



Source: NSF Enterprise Information System, 10/01/14. Note: In FY2010, a total of only 25 research projects were funded from the ARRA appropriation (including one collaborative project). These are barely visible in the figure.

Figure 11 shows the success rates for SPI and MPI research proposals (as distinct from projects). The difference between the SPI and MPI success rates has varied over the last ten years, but the SPI success rate has been consistently higher.

Figure 11 - Success Rates for Single-PI & Multiple-PI Research Proposals



Source: NSF Enterprise Information System, 10/01/14.

F4. Number of Research Grants per PI

Table 9 indicates the number of active research grants per PI averaged over the three-year period 2012 - 2014.

Table 9 - Number of Grants per PI, by percentage of PIs

	One	Two	Three	Four or More
Fiscal Years 2012-2014	81%	14%	3%	2%

Source: NSF Enterprise Information System, 10/01/14.

F5. Number of People Supported on Research Grants

Table 10 shows the number of graduate students, post-doctoral associates, and senior personnel supported on NSF research grants²⁵. These data were extracted from the budget details of research grants active in the year indicated. The absolute numbers of post-doctoral associates and graduate students supported peaked in FY 2009, as a result of NSF policy on the use of ARRA funding, but have subsequently declined. From FY 2013 to FY 2014, the number of

²⁵ The research grant category does not include most individual post-doctoral fellowships and graduate student fellowship grants. However, the majority of NSF-supported post-doctoral associates and graduate students are supported as part of research grants.

post-doctoral associates supported by research grants declined by a further 3.6%, while the number of graduate students recovered somewhat, increasing by 4.6%.

Table 10 - Number of People Supported on NSF Research Grants, by Recipient Type

	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	% Change, 2005 - 2014
Senior Personnel Supported	22,255	23,186	26,176	26,494	33,536	33,650	35,523	39,862	32,829	31,650	42%
Postdocs Supported	4,068	4,023	4,034	3,909	5,580	4,653	4,751	4,596	4,447	4,286	5%
Graduate Students Supported	20,442	20,949	22,777	22,936	33,371	24,554	24,855	25,550	25,161	26,317	29%

Source: NSF Enterprise Information System, 10/01/14.

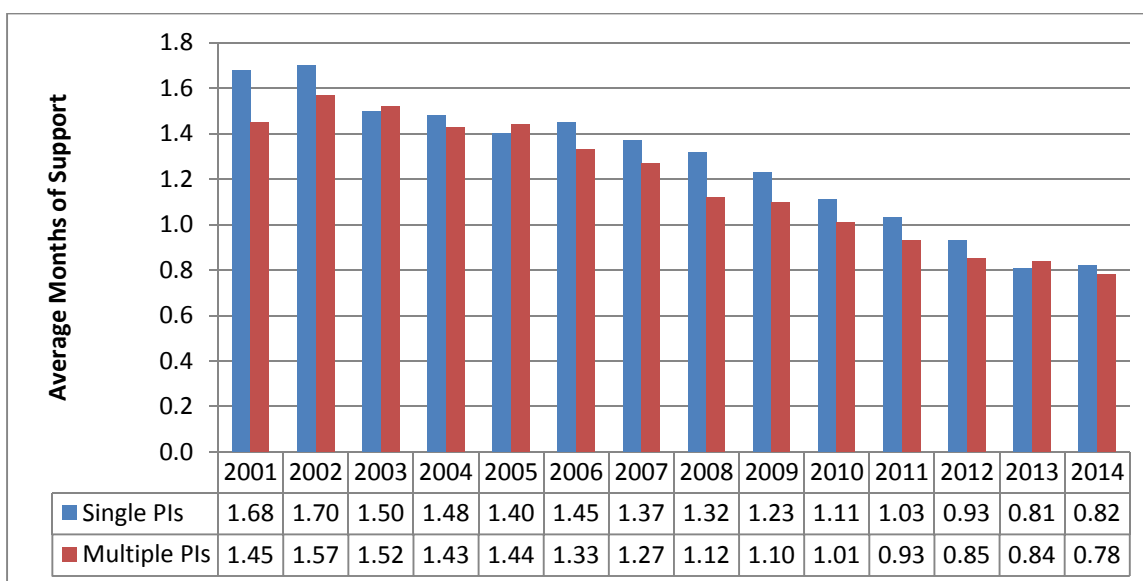
Appendix 8 provides data on the estimated number of individuals involved in activities supported by all NSF active awards, including senior researchers, post-doctoral associates, teachers, and students across all educational levels. In comparison to FY 2013, the numbers of undergraduate students and K-12 students involved in NSF awards increased and the number of K-12 teachers stayed approximately the same.²⁶ In contrast to the number of graduate students supported on research grants, which increased, the number of graduate students involved in activities supported by all NSF active awards declined by approximately 2,000. In FY 2014, the graduate students supported on research grants made up about 66% of the graduate students involved in activities supported by all NSF active awards.

F6. Average Number of Months of Salary Support for Single- & Multiple-PI Research Grants

Figure 12 indicates the mean number of months of salary support per individual on single PI and multiple PI research grants. Months of salary support are for PIs and Co-PIs only. There has been a dramatic change in the past decade. Since FY 2002, the average number of months of support has generally decreased for both single and multiple-PI awards. The per-person numbers for single and multiple-PI grants were comparable in 2003-2005, but from FY 2006 through FY 2012, PIs on multiple-PI awards consistently averaged fewer months of support than single PIs. In FY 2013 and FY 2014, they were approximately equal (within 5%). (See **Appendix 9** for directorate or office level data on months of support.) The per-individual months of support per grant has dropped considerably since the period prior to 2003, with the 2014 numbers being 42% of the 2002 number for single PIs and 48% for PIs and Co-PIs on multiple PI awards. The data by directorate in **Appendix 9** show that, in comparison to NSF as a whole, ENG awards tend to provide fewer months of salary support for PIs and Co-PIs, less than half the NSF average.

²⁶ Beginning with Fiscal Year 2011, the methodology used to produce estimates of K-12 students involved was changed. See NSF FY2012 Agency Financial Report, Chapter 2, p. II-40&41 for more information.

Figure 12 - Average Number of Months of Salary for Single- & Multi-PI Research Grants

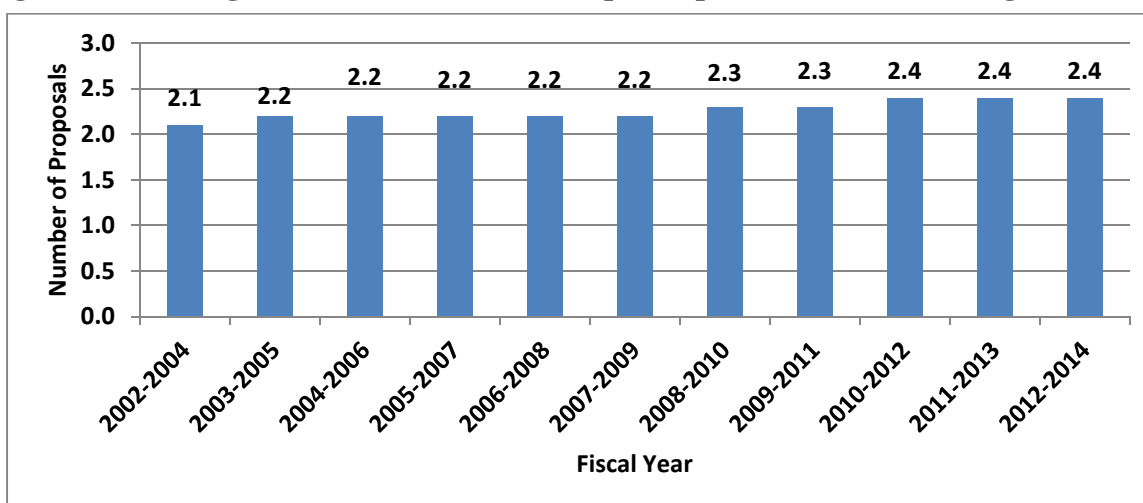


Source: NSF Enterprise Information System, 10/01/14, and NSF Report Server, 12/09/14.

F7. Investigator Submission and Funding Rates

Figure 13 shows that, on average, the number of proposals an investigator submits before receiving an award has gradually increased over the past decade. This average is calculated across all PIs, including both new and previous PIs. **Appendix 10** provides a directorate-level breakout of the average number of research proposals per PI before receiving one award. This metric is largest for CISE, ENG and GEO.

Figure 13 - Average Number of Research Proposals per PI before Receiving One Award

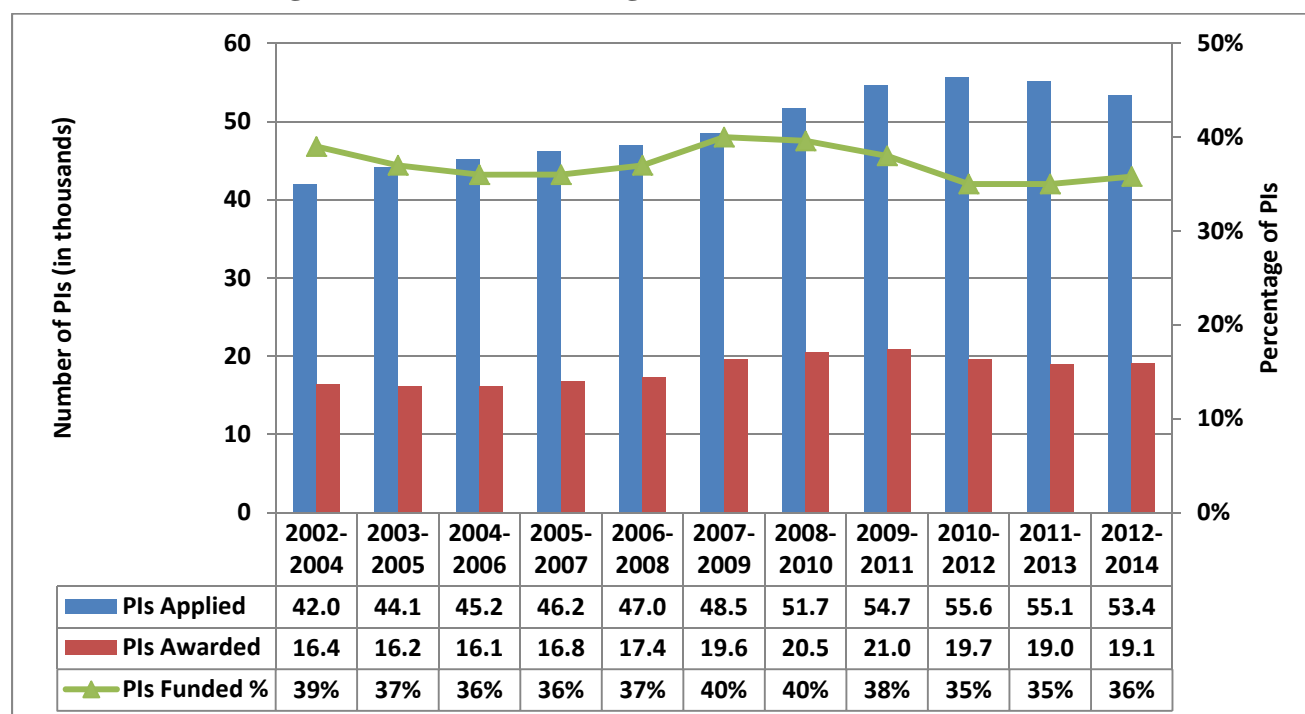


Source: NSF Enterprise Information System, 10/10/14.

Figure 14 provides the funding rate for investigators in a three-year period (the number of investigators receiving a grant divided by the number of investigators submitting proposals in the

same three-year window). The number of investigators submitting proposals grew over most of the past decade at a rate that exceeded the rate of growth of NSF's normal appropriation in inflation-adjusted dollars. Consequently, the success rate of PIs declined. The decline in PI success rate was temporarily reversed by the funds appropriated under ARRA but resumed after this. However, in the latest two three-year windows, the number of PIs submitting proposals has begun to decline and the per-PI success rate is now approaching 36%.

Figure 14 - NSF PI Funding Rates for Research Grants



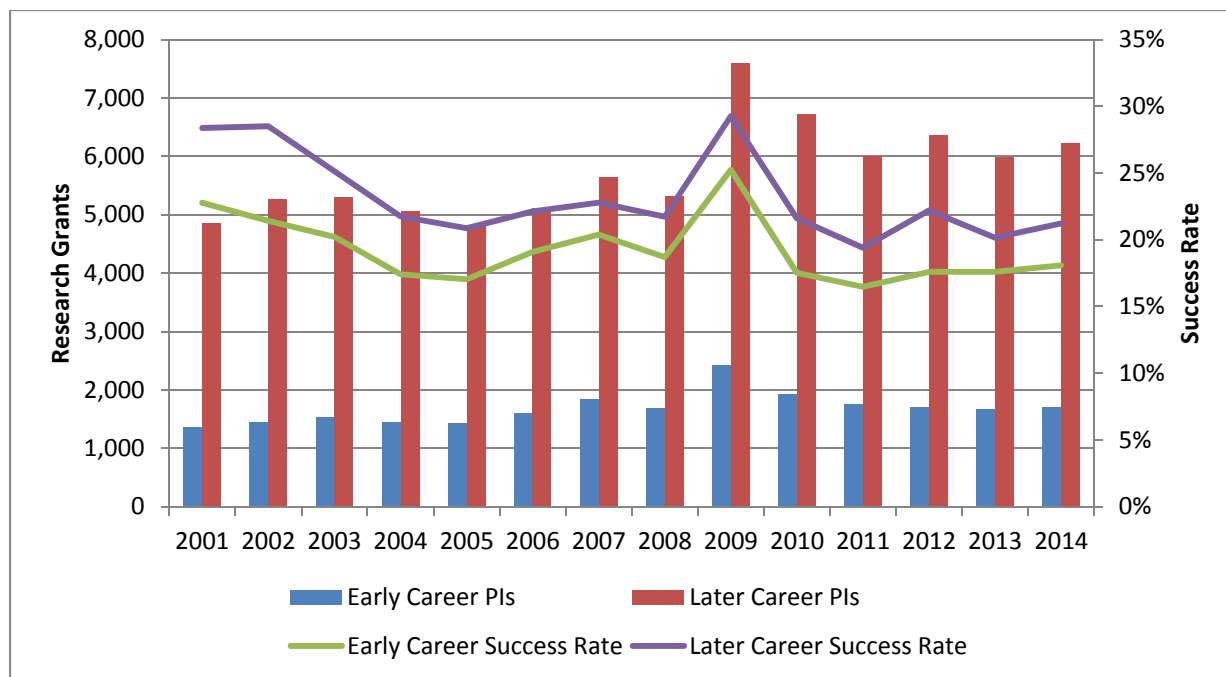
Source: NSF Enterprise Information System, 10/10/14.

In 2012-2014, 64% of PIs who submitted proposals during that three-year period did not receive any research award. The number of PIs who submitted proposals in 2012-2014 was still 36% higher than the number in 2001-2003 (39,182).

F8. Early and Later Career PIs

Figure 15 and **Figure 16** indicate the number and percentage of NSF PIs of research awards that are in the early or later stages of their careers. An early career PI is defined as someone within seven years of receiving his or her last degree at the time of the award. For the purposes of this report, PIs who received their last degree more than seven years before the time of their first NSF award are considered later career PIs.

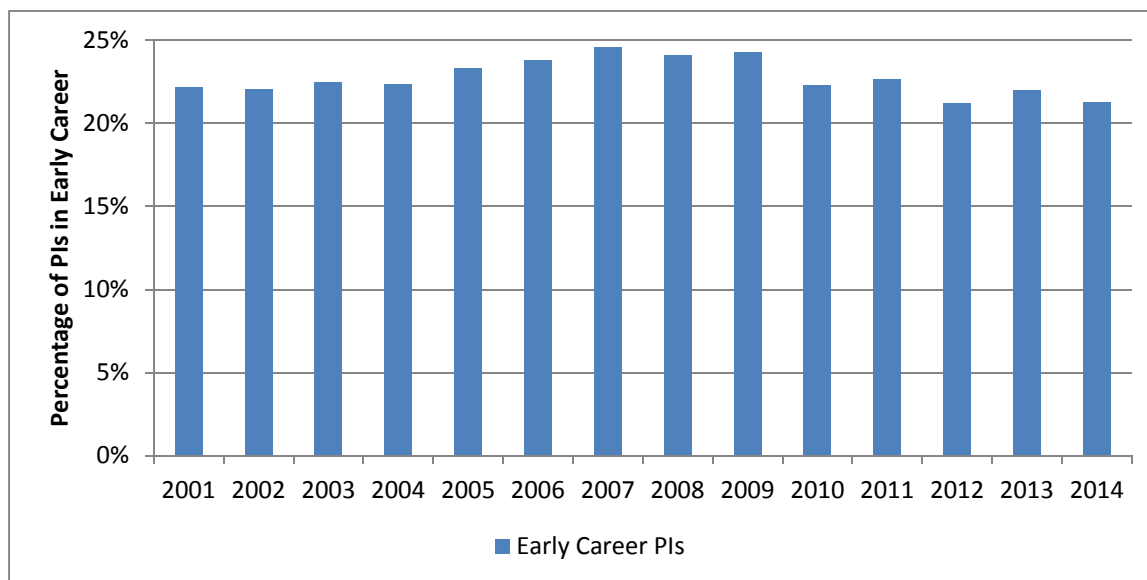
Figure 15 – Research Grants Awarded to PIs in Early & Later Stages of Career and Research Proposal Success Rates



Source: NSF Enterprise Information System, 10/01/14.

The success rates for both early and later career PIs increased in FY 2014 but the gap between them widened slightly (**Figure 15**). The percentage of research awards to early career PIs was 21% (**Figure 16**).

Figure 16 - Relative Proportion of PIs in Early Stage of Careers



Source: NSF Enterprise Information System, 10/01/14.

F9. Mechanisms to Encourage Transformative Research

The March 2007 NSB report, *Enhancing Support of Transformative Research at the National Science Foundation* (NSB 07-32), has been instrumental in informing NSF's efforts to promote and support potentially transformative research. The statement of the Intellectual Merit review criterion was modified, effective January 5, 2008, to make explicit reference to transformative research. An Important Notice, No. 130, was sent on September 24, 2007 from the NSF Director to presidents of universities and colleges, and heads of other NSF grantee organizations, to inform the community of the change in the merit review criteria and NSF's effort to promote and support potentially transformative concepts.

All NSF programs encourage and support potentially transformative research proposals. NSF also has several mechanisms particularly developed to encourage the submission of certain types of potentially transformative research proposals. These include EARly-concept Grants for Exploratory Research (EAGER), Integrated NSF Support Promoting Interdisciplinary Research and Education (INSPIRE), Creativity Extensions, and Accomplishment-Based Renewals. Information on the latter two types of awards may be found in **Appendix 20**.

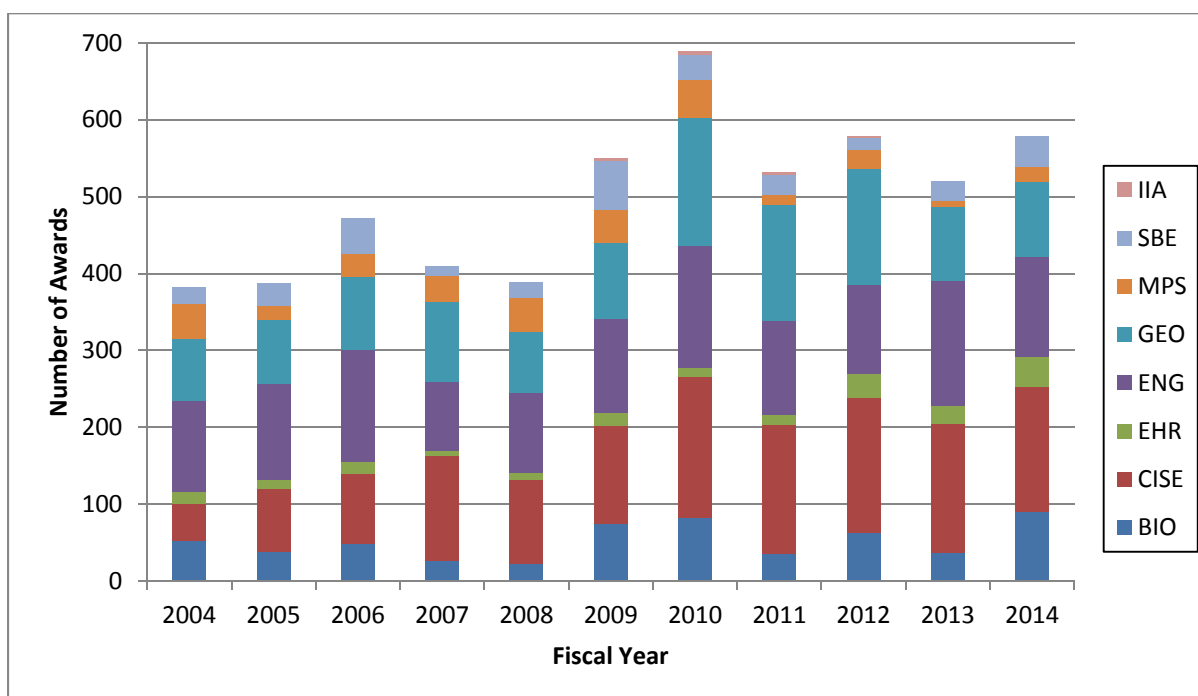
F9.1 Small Grants for Exploratory Research (SGER), EARly-concept Grants for Exploratory Research (EAGER) and Grants for Rapid Response Research (RAPID).

Since FY 1990, the Small Grants for Exploratory Research (SGER) option permitted program officers throughout the Foundation to make small-scale grants without formal external review. Effective January 2009, the SGER funding mechanism was replaced by two separate funding mechanisms EAGER and RAPID, in part to emphasize the importance of funding both potentially transformative research and research requiring an urgent response:

- **EARly-concept Grants for Exploratory Research (EAGER)**
The EAGER funding mechanism is used to support exploratory work in its early stages on untested, but potentially transformative, research ideas or approaches. The work may be considered especially "high-risk/high-payoff" in the sense that it, for example, involves radically different approaches, applies new expertise, or engages novel disciplinary or interdisciplinary perspectives. Requests may be for up to \$300,000 and up to two years duration.
- **Grants for Rapid Response Research (RAPID)**
The RAPID funding mechanism is used for proposals having a severe urgency with regard to availability of, or access to data, facilities or specialized equipment, including quick-response research on natural or anthropogenic disasters and similar unanticipated events. Requests may be for up to \$200,000 and of one year duration.

Only internal merit review is required for EAGER and RAPID proposals. Program officers may elect to obtain external reviews to inform their decision. If external review is to be obtained, then the PI is informed of this.

Figure 17 shows the change in SGERs, EAGERs and RAPIDs from 2004 to 2014 by Directorate. Additional information on SGERs, RAPIDs, and EAGERs can be found in **Appendix 11**. For years prior to FY 2013, OPP and OCI data are included in the numbers for GEO and CISE. OISE data are included in those for IIA.

Figure 17 - SGER, EAGER and RAPID Awards, by Directorate or Office

Source: NSF Enterprise Information System, 10/01/14.

In FY 2009, the total number of SGER, RAPID and EAGER awards was 550, slightly higher than in previous years (see **Appendix 11** for a comparison with SGERs since FY 2004). FY 2010 saw an increase in the total, to 689, primarily because of RAPIDs awarded to enable researchers to respond to unusual events (earthquakes in Haiti and Chile, and the Gulf of Mexico oil spill). The total number of EAGER and RAPID awards decreased to 531 in FY 2011 and fluctuated in the three subsequent years. Notwithstanding the year-to-year fluctuations, the number of these awards in each year of the period FY 2009 – FY 2014 (annual mean = 575) was larger than anytime during the period FY 2004 – FY 2008 (annual mean = 408), before EAGER and RAPID awards were introduced. There is a considerable variation across directorates in the use of EAGER and RAPID awards. (See **Appendix 11**.) For example, in FY 2014, CISE received more than twice as many EAGER proposals as BIO and nearly ten times as many as MPS. RAPID proposals are proportionally more common in GEO than in other units.

In their use of EAGER and RAPID awards, the directorates fall into two clusters (see **Table 11**). Since their introduction, CISE, ENG and GEO have made 29%, 24% and 22% of the EAGER and RAPID awards, accounting for three-quarters of these awards. BIO, SBE, MPS and EHR have made 11%, 6%, 4.5% and 4%. However, with the exception of SBE, the mean award size is larger for this second group of directorates than for the first group.

Table 11 – Investments in EAGER and RAPID awards since inception, by directorate

	CISE	ENG	GEO	BIO	SBE	MPS	EHR
% of FY 09-14 awards	29.1%	23.7%	21.8%	11.0%	5.6%	4.5%	4.0%
FY 09-14 investment (\$ million)	156	83	61	69	18	26	31
Mean FY14 award (\$ thousand)	181	125	84	228	130	184	252

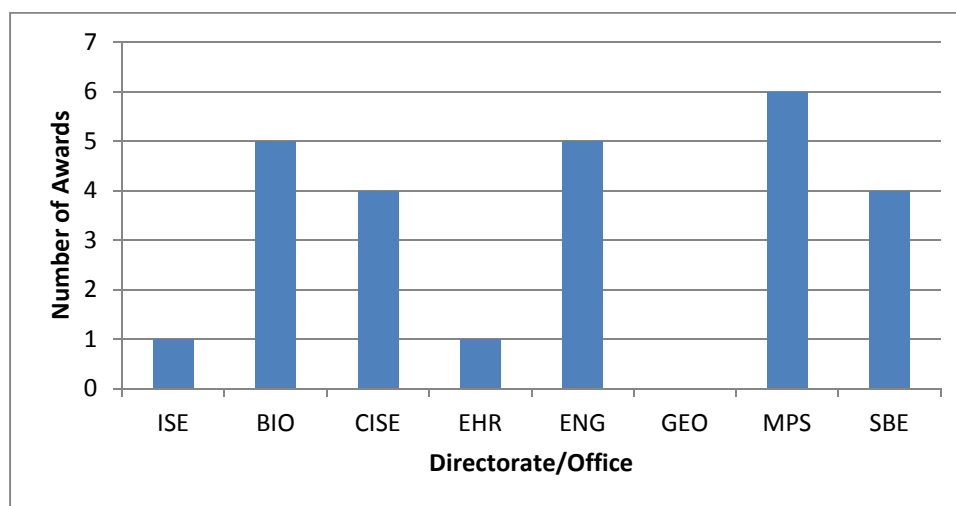
F9.2 Integrated NSF Support Promoting Interdisciplinary Research and Education (INSPIRE) Awards.

FY 2012 saw the inauguration of the **Integrated NSF Support Promoting Interdisciplinary Research and Education (INSPIRE)** program. INSPIRE is intended to support transformative, cross-disciplinary science, creating a new type of funding opportunity. INSPIRE is designed to attract unusually creative, high-risk / high-reward interdisciplinary proposals. No favored topics are designated, and the funding opportunity is open to innovative, interdisciplinary proposals that fall within the overall span of NSF-supported areas of science, engineering, and education research. Program managers are encouraged to use new tools, collaboration modes and techniques in the merit review process to widen the pool of prospective discoveries. The program creates new interdisciplinary research opportunities. In addition to a few Track 1 awards, FY 2014 saw the first Track 2 awards made under this program.²⁷

In FY 2014, 3 new INSPIRE Track 1 awards and 6 new INSPIRE Track 2 awards were made. For comparison, in FY 2013, 53 Track 1 and zero Track 2 awards were made. Reflecting the interdisciplinary nature of these projects, all were supported by different units within NSF.

Figure 18 shows the number of INSPIRE awards supported by each directorate in FY2014. Track 1 awards include co-funding by two or more units outside IIA and by IIA. Track 2 awards are funded by IIA but only if they have endorsement from three or more units outside IIA. All INSPIRE awards therefore have IIA involvement separate from any ISE contribution. For this reason, the only IIA involvement shown in **Figure 18** is funding from ISE. In one instance, the award was supported by units wholly within a single directorate (MPS). In one case, the award was supported by units in two directorates, in six cases, by three directorates, and in one case, four. One award also had funding from the International Science and Engineering section of IIA.

Figure 18 – INSPIRE Awards Supported by NSF Directorates in FY2014



Source: NSF INSPIRE Program, 1/3/14.

²⁷ INSPIRE Track 1 awards are limited to a maximum award size of \$1,000,000, a maximum duration of five years and must be substantially co-funded by *two* or more intellectually distinct NSF divisions or programs. INSPIRE Track 2 awards are for mid-scale, interdisciplinary projects and can be for up to \$3,000,000 with a maximum duration of five years. They must be endorsed by at least *three* intellectually distinct NSF divisions or programs whose research communities do not have a well-established history of collaboration. See NSF 13-518.

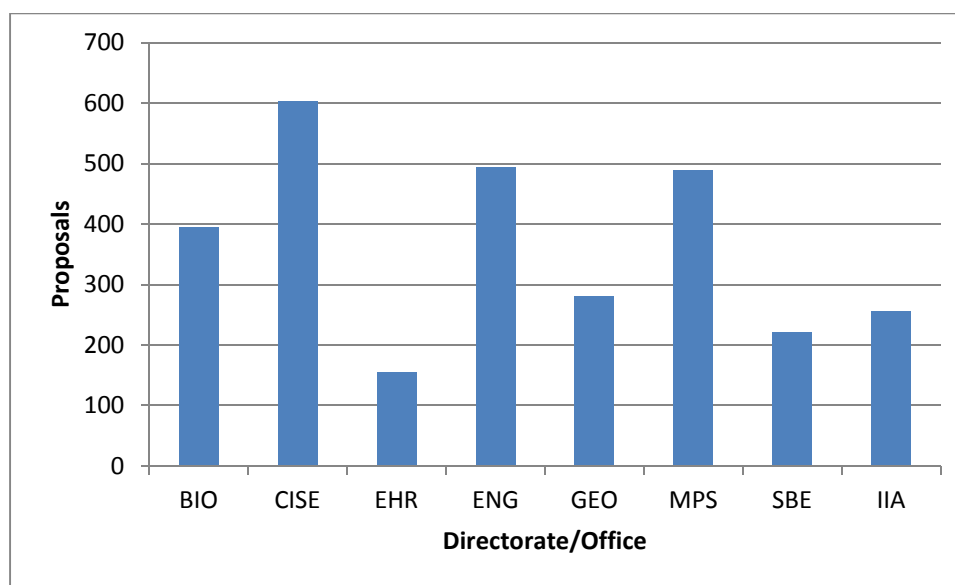
F10. Multi-Panel Review and Inter-Divisional Co-Funding.

NSF does not ask PIs to identify formally whether or not a proposal is interdisciplinary, and it is not possible currently to make a direct count of the number of interdisciplinary proposals NSF receives. Indeed, a precise definition of interdisciplinarity is elusive²⁸ and likely to be time-dependent. For example, a research area that, when it emerges, straddles the boundary of two different disciplines may, over time, come to be recognized as a new discipline. However, one can examine a number of characteristics of proposals, awards and the review process that may have operational utility by providing information on proposals that cross the boundaries of NSF's established program areas. This section of the report describes two such characteristics.

Inter-Divisional Co-funding

One indicator of the number of interdisciplinary awards is the number of awards that are funded by more than one part of NSF. **Figure 19** shows the distribution of co-funding for competitive awards that received funding from more than one division at NSF in FY 2014.

Figure 19 - FY 2014 Awards Co-funded



Source: NSF Enterprise Information System, 10/01/14 and 3/12/14.

The total number of unique, co-funded awards included in **Figure 19** is 1,329, which is approximately 12.1% of FY 2014 competitive awards. IIA is included separately in this figure.

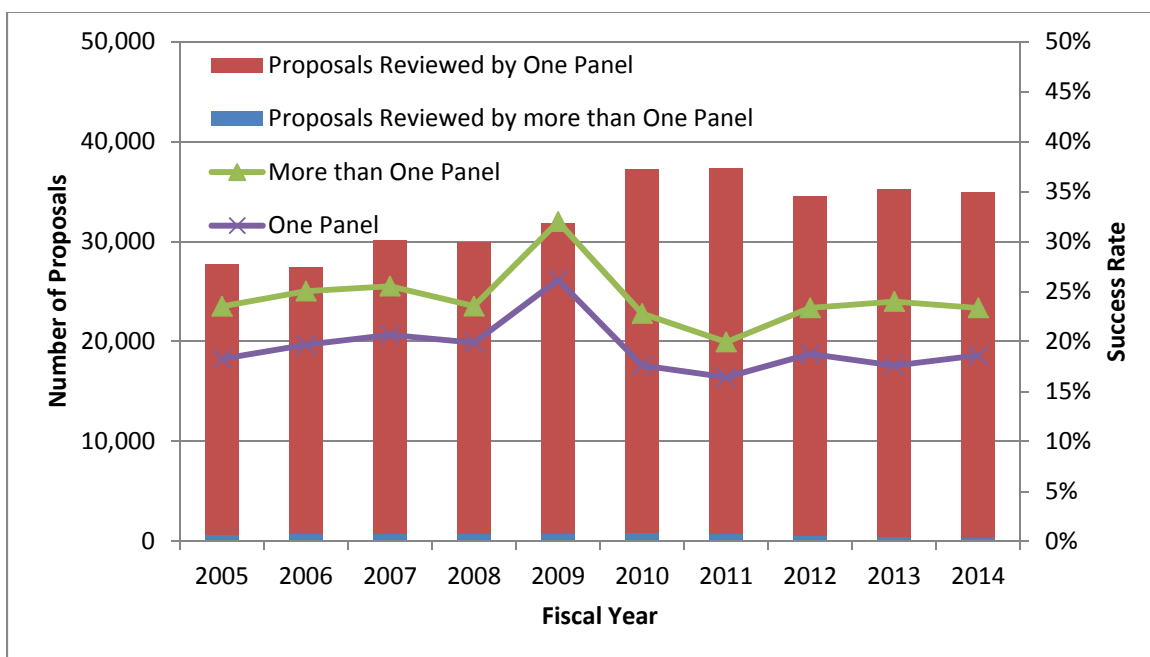
²⁸ Multiple definitions of interdisciplinarity appear in the literature as well as debate over the distinction between multidisciplinary, interdisciplinary and transdisciplinary. Nor is there a universally accepted definition of “discipline.” In a 2005 report, the National Research Council noted that, “No single definition is likely to encompass the diverse range of activities that have been described under the heading of IDR [Interdisciplinary Research].” The report provided the following description: “Interdisciplinary research (IDR) is a mode of research by teams or individuals that integrates information, data, techniques, tools, perspectives, concepts, and/or theories from two or more disciplines or bodies of specialized knowledge to advance fundamental understanding or to solve problems whose solutions are beyond the scope of a single discipline or field of research practice.” (From “Facilitating Interdisciplinary Research,” National Academies Press, 2005.)

The average number of divisions contributing to a co-funded award is 2.2.²⁹ Co-funding associated with EPSCoR or international activities does not, of itself, imply interdisciplinary proposal content. If we remove awards in which co-funding is between IIA/ISE or IIA/EPSCoR and a single other division, then the number of co-funded awards is approximately 1,108 or 10.1% of FY 2014 competitive awards and the average number of divisions contributing to a co-funded award is again 2.2. Of these awards, 365 are co-funded wholly within a directorate.

Multi-Panel Review

Interdisciplinary proposals are reviewed in a variety of ways. A relatively small fraction of them are reviewed by multiple panels. One question of interest is whether review by more than one panel leads to a lower success rate than review by a single panel.

Figure 20 – Proposals Undergoing Single- and Multi-Panel Reviews and their Success Rates



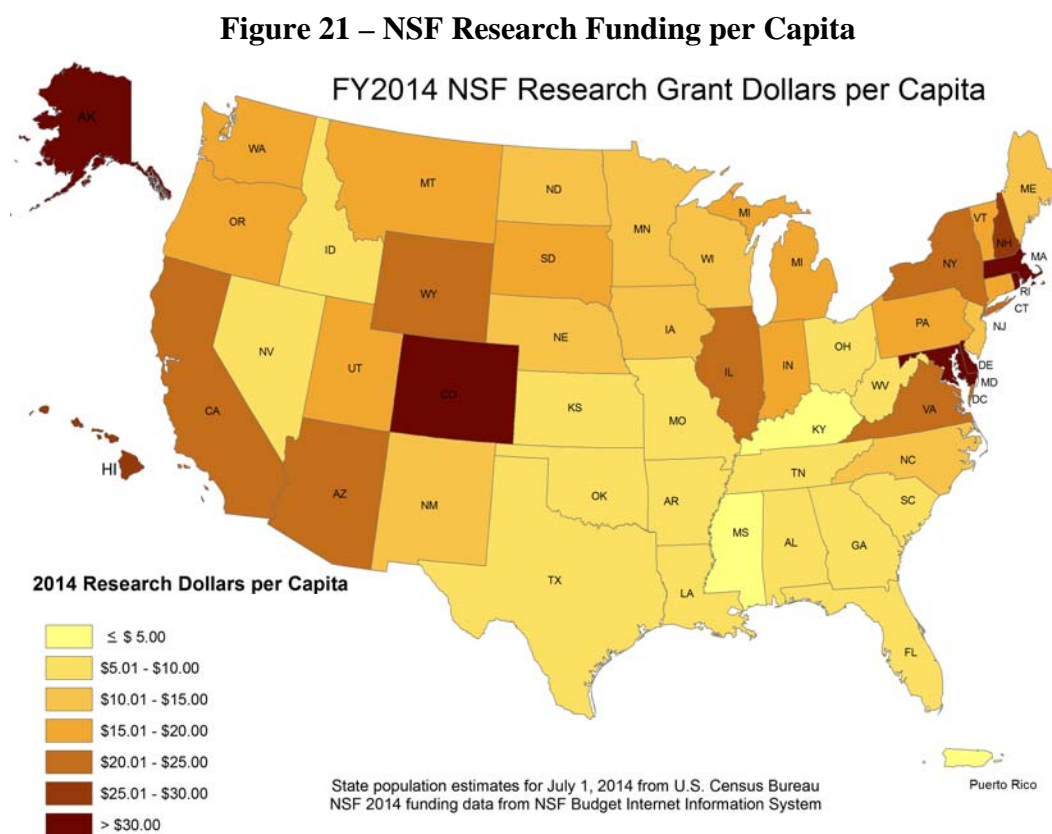
Among proposals reviewed by panels, **Figure 20** shows the number of research proposals that were considered by one panel (red bars), the number reviewed by more than one panel (blue bars), the success rate for single-panel review (purple line), and the success rate for multi-panel review (green line).

²⁹ In **Figure 19**, awards appear once for each distinct funding source. Awards that receive co-funding from distinct divisions within the same directorate are included. (E.g., an award co-funded by the Division of Physics and the Division of Chemistry would be counted twice in the MPS total.) The figure does not include co-funding by different programs within the same division. In general, co-funding from Directorate front offices is not counted as a separate co-funding source for **Figure 19** unless the front office is the only part of the directorate co-funding an inter-directorate award.

The proportion of empanelled proposals going through multi-panel review is small (1.2% of the total in FY 2014). This number was 2.7% in FY 2006 and has declined every year since then. Most multidisciplinary proposals are not reviewed by multiple panels. However, the success rate for proposals reviewed by more than one panel is consistently 4 to 6 percentage points higher than the rate for proposals that are only reviewed by a single panel.

F11. Geographic Distribution of Research Awards

Figure 21 shows the distribution of the total value of NSF research funds awarded in FY 2014 by state.³⁰ In **Figure 21**, the shading indicates the NSF research funding by state for FY 2014 normalized by population based on state population estimates for July 1, 2014 from the U.S. Census Bureau. The darker colors indicate a higher amount of funding per capita. The national average (mean) amount per capita is \$17.39. The median of FY 2014 funding per capita in the various states, the District of Columbia and Puerto Rico is \$14.85 per capita.



³⁰ Data on research funding was accessed from the NSF Budget Internet Information System on 3/15/2014. The data include both new awards and the FY 2014 annual increments for continuing grants and cooperative agreements. Data for the District of Columbia are not shown on the map.

IV. The NSF Merit Review Process

A. Merit Review Criteria

In FY 1998, the National Science Board approved the use of the two NSF merit review criteria. In 2007, the NSB modified the criteria to promote potentially transformative research. In December 2011, the NSB completed a review of the merit review criteria. The outcome of that review was to retain the existing two NSF merit review criteria but to revise the elements to be considered by reviewers in the application of those criteria.³¹ In addition, the NSB articulated principles upon which the two Merit Review Criteria are based. The language in the *Grant Proposal Guide* describing the merit review criteria and the principles on which they are based was revised in October 2012 to incorporate the recommendations from the National Science Board.³² This revised language applied to proposals submitted on or after January 14, 2013, or in response to deadlines that were on or after January 14, 2013 and is reproduced in **Appendix 12**.

The two NSF-wide merit review criteria are Intellectual Merit and Broader Impacts. The Intellectual Merit criterion encompasses the potential to advance knowledge. The Broader Impacts criterion encompasses the potential to benefit society and contribute to the achievement of specific, desired societal outcomes. Programs may have additional review criteria particular to the goals and objectives of the program. All relevant review criteria are described in the program announcement or solicitation.

Effective October 1, 2002, NSF returned without review proposals that failed to separately address both merit review criteria within the Project Summary. In addition, proposals are returned without review if they duplicate an existing award, are not responsive to the funding opportunity to which they were submitted, do not comply with the requirements of the Grant Proposal Guide and/or specific solicitation, as well as in a number of other circumstances.

B. Description of the Merit Review Process

The NSF merit review process includes the steps listed below and is depicted in **Figure 22**:

- The proposal arrives electronically and is assigned to the appropriate program(s) for review. Some programs also include preliminary proposals as part of the application process. See **Appendix 2** for more information about preliminary proposals. Proposals that do not comply with NSF regulations, as stated in the *Grant Proposal Guide*, may be returned without review. (See **Table 12** and **Appendix 13**.)
- The review process is overseen by a division director, or other appropriate NSF official.
- The program officer (or team of program officers) is responsible for the following:

³¹ “The National Science Foundation’s Merit Review Criteria: Review and Revisions.” (2011) NSB/MR-11-22.

³² The NSF *Grant Proposal Guide* (GPG) applicable from October 1, 2013 to February 23rd, 2014 is available at: http://www.nsf.gov/pubs/policydocs/pappguide/nsf13001/gpg_index.jsp. The version of the GPG applicable for the remainder of FY 2014 may be found at: <http://www.nsf.gov/pubs/policydocs/pappguide/nsf14001/gpgprint.pdf>.

- Reviewing the proposal and determining the appropriate level of merit review. (Some proposals do not require external review. These include, for example, EAGERs, RAPIDs, INSPIRE Track 1s, and proposals for small conferences, workshops, or symposia.)
- Selecting reviewers and panel members. Selection may be based on the program officer's knowledge, references listed in the proposal, individuals cited in recent publications or relevant journals, presentations at professional meetings, reviewer recommendations, bibliographic and citation databases, or proposal authors' suggestions.
- Checking for conflicts of interest. In addition to checking proposals and selecting reviewers with no apparent potential conflicts, NSF staff members provide reviewers guidance and instruct them how to identify and declare potential conflicts of interest. All NSF program officers receive annual conflict of interest training.
- Synthesizing the comments of the reviewers and review panel (if reviewed by a panel), as provided in the individual reviews and panel summaries.
- Recommending action to award or decline the proposal, taking into account external reviews, panel discussion, and other factors such as portfolio balance and the amount of funding available.

Table 12 - Proposals Returned Without Review³³ (RWR)

Fiscal Year	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014
Number of Proposals RWR	1216	1306	1505	1287	1741	2628	1794	1813	1871	1659
Percent of all Proposal Decisions	2.8%	3.0%	3.3%	2.8%	3.7%	4.5%	3.4%	3.6%	3.7%	3.3%

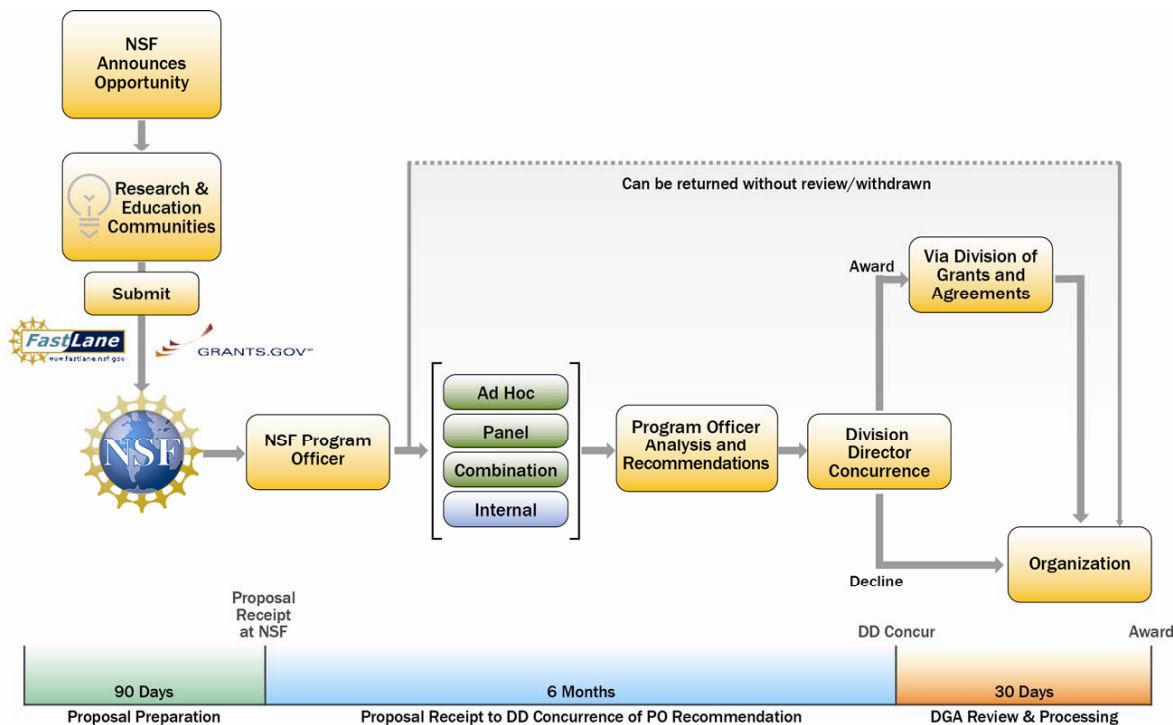
Source: NSF Enterprise Information System, 10/01/14.

The division director, or other appropriate NSF official, reviews all program officer recommendations. Large awards may receive additional review. The Director's Review Board examines award recommendations with an average annual award amount of 2.5% or more of the awarding division's annual budget (prior year current plan). The National Science Board (NSB) reviews recommended awards with an annual award amount at or above 1% of the awarding directorate's prior year current plan or 0.1% of NSF's prior year total budget, whichever is greater.³⁴ In FY 2014, NSB authorized 5 funding items: 4 awards and one continuation of an existing award.

³³ In prior years, this table has reported only those proposals returned without review for failing to address both merit review criteria. The latter are only a fraction of the proposals returned without review. This table now shows all full proposals returned without review. **Appendix 13** shows the breakdown of the FY 2014 total by reason for return.

³⁴ Other items requiring NSB prior approval include new programs, major construction projects that meet certain specifications, as well as programs and awards involving policy issues.

Figure 22 -Diagram of the NSF Merit Review Process



After a division forwards an award recommendation to the Office of Budget, Finance, and Award Management (BFA), a grants and agreements officer performs an administrative review of the recommendation. If the results of this review are satisfactory, BFA makes the award.

NSF has several oversight and advisory mechanisms relevant to the merit review process:

- External Committees of Visitors (COV), the membership of which is comprised of scientists, engineers, and educators, assess each major NSF program every 3-5 years. COVs examine the integrity and efficiency of merit review processes and the structure of the award portfolio.
- NSF directorates and offices have Advisory Committees comprised of scientists, engineers, administrators, and educators, from academia, other non-profit organizations, and industry. One of the tasks of these Advisory Committees is to review COV reports and responses from directorates and offices in order to provide guidance to the Foundation. The COV reports and NSF responses are publicly available on the NSF website.
- An external contractor performs an independent verification and validation of programmatic performance measurements, which include aspects of the merit review process.

Additional information about COVs, and NSF Advisory Committees, is given in **Appendix 14**.

C. Program Officer Award/Decline Recommendations

As noted above, the narrative comments and summary ratings provided by external reviewers are essential inputs to program officers who use their professional judgment to make award and decline recommendations to NSF senior management.

NSF program officers are experts themselves in the scientific areas that they manage. They have advanced educational or professional training (e.g., a Ph.D., P.E., or equivalent credentials) in science or engineering and relevant experience in research, education, and/or administration. They are expected to produce and manage a balanced portfolio of awards that addresses a variety of considerations and objectives. When making funding recommendations, in addition to information contained in the external proposal reviews, NSF program officers evaluate proposals in the larger context of their overall portfolio and consider issues such as:

- Support for high-risk proposals with potential for transformative advances in a field;
- Novel approaches to significant research and education questions;
- Capacity building in a new and promising research area;
- Potential impact on human resources and infrastructure;
- NSF core strategies, such as 1) the integration of research and education, and 2) broadening participation;
- Achievement of special program objectives and initiatives;
- Other available funding sources; and
- Geographic distribution.

D. Review Information for Proposers and the Reconsideration Process

Proposers receive notification of the award/decline decision, copies of all reviews used in the decision with reviewer-identifying information redacted, and a copy of the panel summary (if a panel review was conducted). A "context statement" is also sent that explains the broader context within which any given proposal was reviewed. Program officers are expected to provide additional communication (either in writing or by phone) to proposers in the case of a decline recommendation, if the basis for the decision is not provided in the panel summary.

If, after receiving the reviews and other documentation of the decision, an unsuccessful proposer would like additional information, he or she may ask the program officer for further clarification. If, after considering the additional information, the applicant is not satisfied that the proposal was fairly handled and reasonably reviewed, he or she may request formal reconsideration. Information about the reconsideration process is included in decline notifications.³⁵ A reconsideration request can be based on the applicant's perception of procedural errors or on disagreements over the substantive issues dealt with by reviewers. If the relevant NSF assistant director or office head upholds the original action, the applicant's institution may request a second reconsideration from the Foundation's Deputy Director.

³⁵ Certain types of proposal actions are not eligible for reconsideration. See NSF *Grant Proposal Guide* (GPG) at http://www.nsf.gov/pubs/policydocs/pappguide/nsf14001/gpg_4.jsp#IVD.

NSF declines approximately 37,000 – 40,000 proposals per year but usually receives only 30-50 requests for formal reconsideration annually. The number of requests for formal reconsideration and resulting decisions at both the Assistant Director and Deputy Director levels from FY 2004 through FY 2014 are displayed in **Appendix 15**. NSF received 33 formal reconsideration requests in FY 2014; 32 decline decisions were upheld, one reconsideration was pending at the time the data were collected, and no decline decisions were reversed.

E. Methods of External Review

The Foundation’s merit review process relies on the use of knowledgeable experts from outside NSF. As stated in the *Grant Proposal Guide* (GPG), proposals usually receive at least three external reviews. Under some circumstances, the requirement for external review can be waived.³⁶

NSF programs obtain external peer review by three principal methods: (1) “mail-only,” (2) “panel-only,” and (3) “mail + panel” review.

In the “mail-only” review method, reviewers are sent links to proposals and asked to submit written comments to NSF through FastLane, NSF’s web-based system for electronic proposal submission and review.

“Panel-only” refers to the process of soliciting reviews from panelists who convene to discuss their reviews and provide advice as a group to the program officer.

Many proposals submitted to NSF are reviewed using some combination of these two processes. Those programs that employ the “mail + panel” review process have developed several different configurations, such as:

- Mail reviewers submit reviews before the panel convenes and the panel’s discussion is informed by the mail reviews.
- A panel meets to discuss proposals. The panel and/or program staff may identify proposals where additional reviewing expertise would be helpful. After the panel, appropriate reviewers are asked to submit mail reviews to supplement the panel’s advice.

The total numbers of individual, narrative reviews and the average numbers of reviews per proposal obtained by the three different review methods are presented in **Table 13**.³⁷

³⁶ Exemptions that program officers may choose to exercise, for example, include proposals for EAGER, RAPID, some INSPIRE proposals, and certain categories of workshop and symposia proposals. See **Appendix 11** for more information about EAGER and RAPID proposals.

³⁷ The table only shows reviews written by individuals. Panel discussions may, and often do, include the input of reviewers who have read the proposal but have not been asked to provide a separate written review. A panel summary therefore often represents a review perspective that is larger than that which is captured in the written reviews. The number of reviews per proposal in the last line of the table therefore underestimates the amount of reviewer input when a panel is part of the review process.

* Only written reviews prepared by individuals, whether a mail reviewer or a panelist, are counted in **Table 13**.

Table 13 - Reviews per Proposal, FY 2014

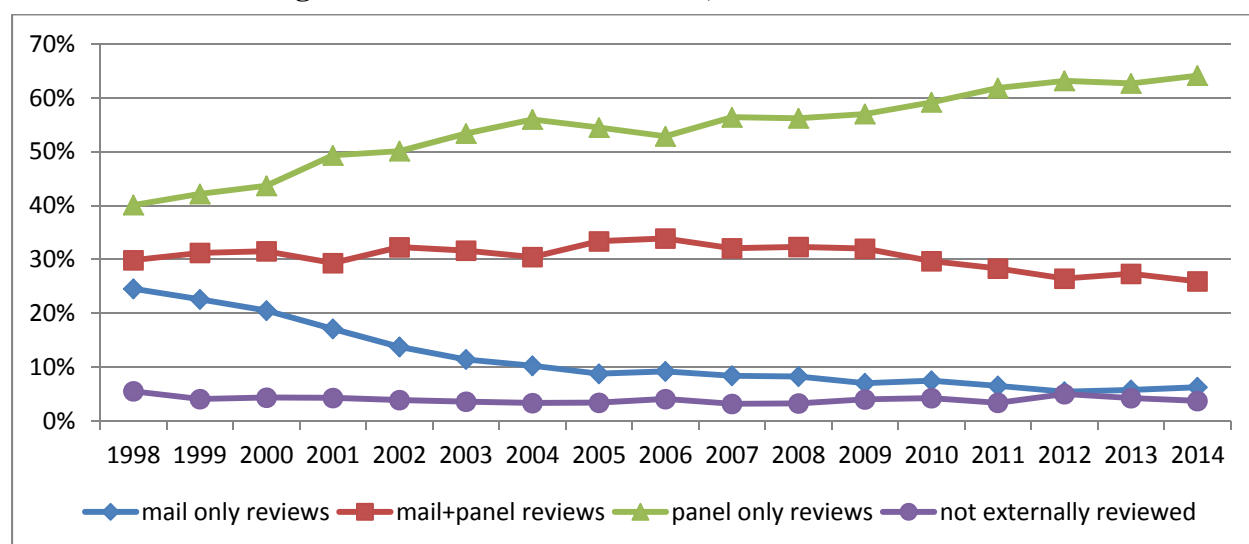
	All Methods	Mail + Panel	Mail-Only	Panel-Only
Reviews*	181,460	59,090	12,285	110,085
Proposals	46,269	12,452	3,001	30,816
Rev/Prop	3.9	4.7	4.1	3.6

Source: NSF Enterprise Information System, 10/01/14.

The mail-plus-panel method had the highest number of reviews per proposal, averaging 4.7, while the panel-only method averaged 3.6. Directorate-level data for FY 2014 are presented in **Appendix 16**.

In addition, site visits (on-site and reverse-site) by NSF staff and external members of the community are often used to review proposals for facilities and centers. NSF program officers are given discretion in the specific use of review methods, subject to approval by the division director or other appropriate NSF official.

The use of various review methods has changed markedly over time, as shown in **Figure 23**. The data for FY 2002 - 2014 are provided in **Appendix 17**, and **Appendix 18** provides FY 2014 data on the review methods used by directorates and offices. **Appendix 19** shows the average review ratings that result from the different methods of review.

Figure 23 - FY 1998-2014 Trend, NSF Review Method

Source: NSF Enterprise Information System, 10/01/14.

There are a number of reasons for the trends in **Figure 23**. Panels allow reviewers to discuss and compare proposals. The panel review process has the advantage that different perspectives can be discussed and integrated, if appropriate. Panels tend to be used for programs that have deadlines and target dates, as opposed to unrestricted submission windows. Using only panels in the review process tends to reduce proposal processing time (time-to-decision), compared to

mail-only reviews. For example, in FY 2014, 75% of all proposals reviewed by panel-only were processed within six months, compared to 65% for mail + panel and 52% for mail-only.³⁸

One advantage of mail review is that the expertise of the reviewers can be more precisely matched to the proposal. The mail + panel review process is used frequently because it combines the in-depth expertise of mail review with the comparative analysis of panel review.

In-person review panels also have some drawbacks. For example, some qualified individuals may find it difficult to be absent from home or work for the several days that might be required to travel to NSF and participate in a panel. In addition, the average number of proposals that a panelist is asked to review in a funding cycle is considerably higher than the number of reviews asked of a mail reviewer. This high workload may deter some individuals who would otherwise be willing to participate in the review process.

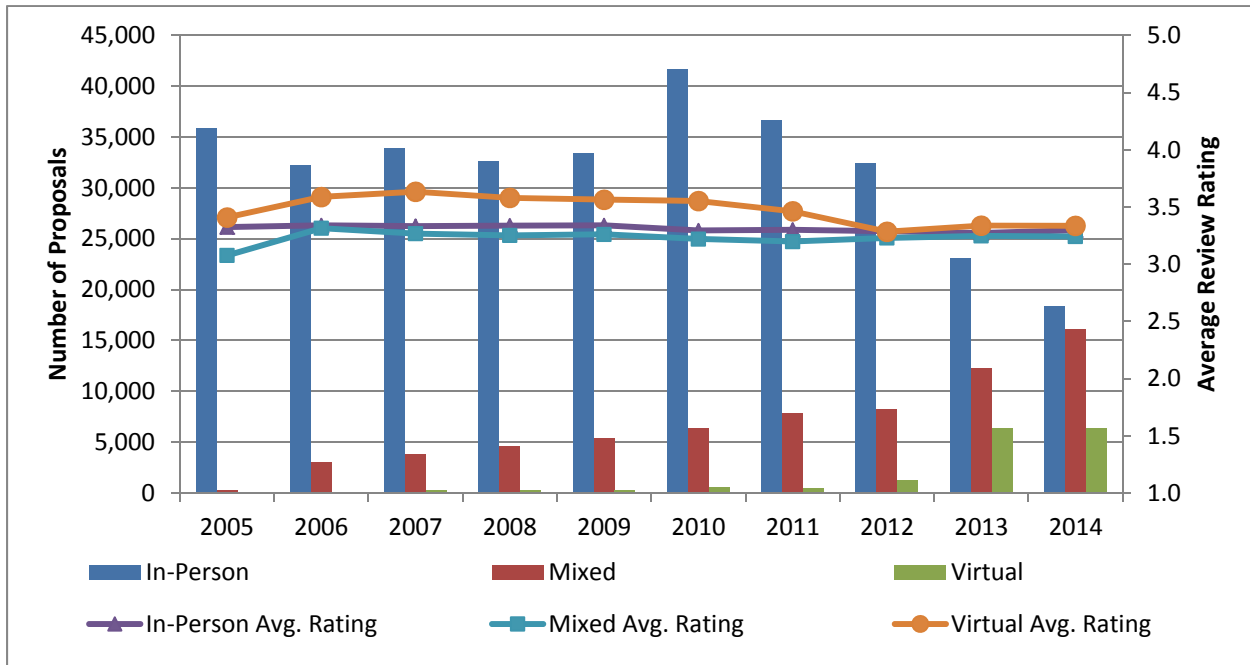
In recent years, “virtual panels” have emerged as an alternative to in-person review panels. In FY2014, approximately 31%³⁹ of panels at NSF were held virtually. Virtual panels can help address some of the drawbacks noted with in-person panels, while retaining the comparative analysis provided by a panel review. In addition, virtual panels offer NSF staff and panelists greater flexibility in structuring the panel review. In virtual panels, panelists participate from their remote locations and interact using NSF’s Interactive Panel System (IPS), accompanied by a teleconference, videoconference, or a virtual world system such as Second Life. Use of virtual panels supports NSF’s efforts to improve career-life balance and broaden the participation of highly qualified individuals in the review process. Examples of groups who may face difficulties participating in in-person review panels include: researchers with young children or who provide elder care; researchers with disabilities that make travel difficult or whose home environment provides special assistive technologies; and researchers with heavy teaching commitments or other work commitments that would make a two-day or three-day absence difficult. **Figure 24** shows the number of proposals reviewed by different types of panels since FY 2005 and the proposal ratings by panel review type (in-person, virtual, and mixed).⁴⁰ Mixed panels are panels in which some reviewers participate in person and some use a telephone or video connection to participate from a remote location. Mixed panels tend to have more complicated social dynamics and can be more difficult to moderate; however, they can be useful in broadening participation in the review process or when unforeseen events prevent a reviewer from travelling to an in-person panel.

The fundamental mode of operation of panels is the same whether they are virtual, in-person or mixed; however, for a number of reasons, NSF believes that the use of a virtual panel approach works best when the size of the panel and the number of proposals considered are relatively small. This is reflected in the statistics of the three types of panels shown in **Table 14**.

³⁸ The lower value for mail-only may be a reflection of the fact that a number of the programs that use this method do not have submission deadlines, rather than a direct consequence of the method of obtaining reviews.

³⁹ Data provided by NSF’s Division of Administrative Services. They include virtual panels used by the Graduate Research Fellowship Program.

⁴⁰ For consistency with prior years’ reports, we repeat the practice of basing this figure on a subset of the competitively reviewed proposals from which certain proposals, such as fellowship proposals, have been excluded.

Figure 24 - FY 2005-2014 Usage and Proposal Rating by Panel Review Type⁴¹

Source: NSF Enterprise Information System, 10/01/14 and 12/11/2014. In FY 2005 and FY 2006, the numbers of proposals reviewed by virtual panels are below 100 and imperceptible on the figure.

Because virtual panels, on average, review fewer proposals per panel than in-person panels (averaging 15.1 and 33.2, respectively), only 15.5% of proposals that were reviewed by panels went through virtual panels in FY 2014.

Table 14 - Data on Virtual, Mixed and In-Person Panels held in FY 2014⁴²

	Virtual	Mixed	In-Person	TOTAL
Panels	520	639	662	1,821
Proposals*	7,827	20,769	21,997	50,593
% of Total Panels	28.6%	35.1%	36.4%	100.0%
% of Total Proposals	15.5%	41.1%	43.5%	100.0%
Proposals/Panel	15.1	32.5	33.2	27.8
Panelists	2,957	6,460	6,109	15,526
Panelists/Panel	5.7	10.1	9.2	8.5
Proposals/Panelist	2.6	3.2	3.6	3.3

* Proposals that were reviewed by more than one panel are counted once for each panel to which they went. In general, collaborative projects are only included once for each panel in which they are reviewed. Individual reviewers are counted once for each panel on which they serve.

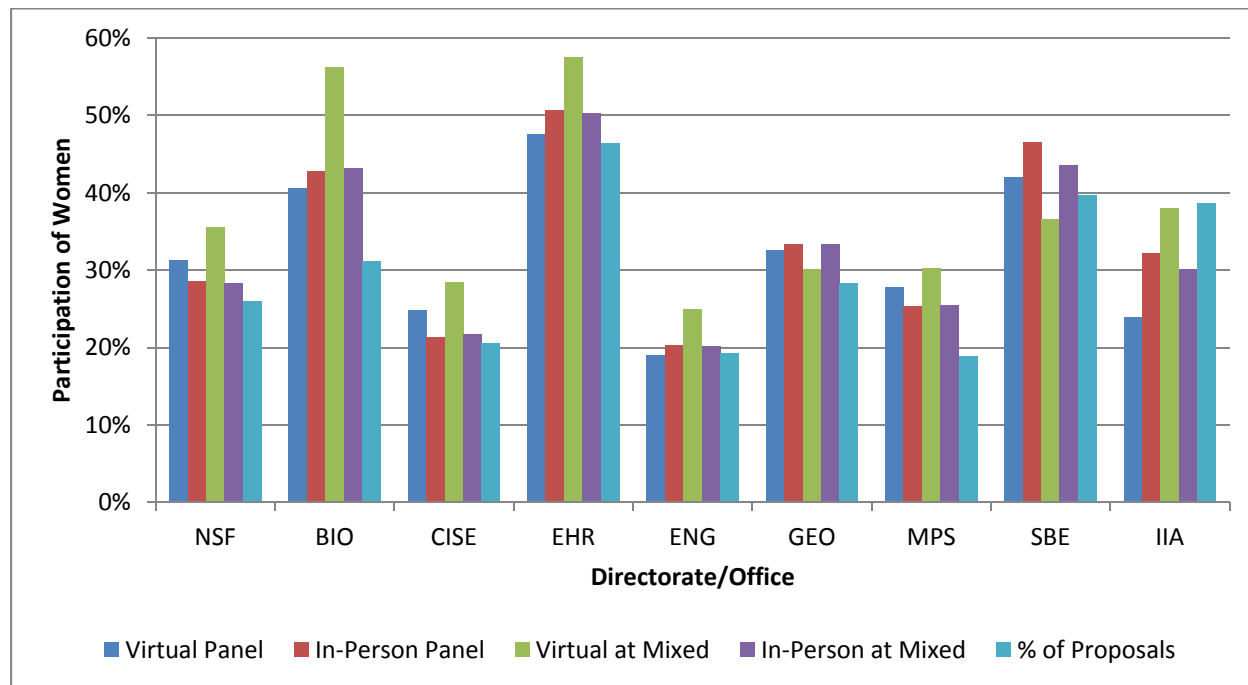
⁴¹ As in previous years, the data in **Figure 24** correspond to panels that reviewed proposals that were recommended for award or decline by division directors in the stated fiscal year. Thus, for example, some of the panels associated with FY 2014 occurred prior to the beginning of FY 2014 and some of the panels that occurred late in FY 2014 are not associated with FY 2014 because proposals from these panels were not recommended until FY 2015.

⁴² Unlike **Figure 24**, the data in this table include only those panels that took place in the given fiscal year, FY 2014. Panels reviewing items not assigned proposal numbers are excluded. Panels reviewing preliminary proposals are included.

In addition to avoiding the burden of travel to NSF, virtual panelists are also, on average, assigned a smaller workload than in-person panelists.

As noted earlier, demographic data for reviewers is relatively sparse. This is particularly true for race, ethnicity and disability status. However, information on the gender of panelists is more complete and is summarized in **Figure 25**.

Figure 25 – Participation of Female Reviewers in Virtual, In-Person, and Mixed Panels during FY 2014⁴³



Source: NSF Enterprise Information System, 3/15/15.

Of the 15,526 panelists⁴⁴ in FY 2014, gender information was available for 81.3%. This permitted an examination of whether there was any significant difference between the ratio of male and female panelists in virtual panels and that in in-person panels. Amongst panelists for whom gender information was recorded, 28.7% of panelists on in-person panels and 31.3% of panelists on virtual panels were women. For both types of panels, women participate at a slightly higher rate than their representation amongst proposers (26.1% for competitive proposals and 24.7% for research proposals).

Mixed panels exhibit a difference between the demographics of those panelists who attend in-person and of those that participate virtually. Averaging across all of the mixed panels in FY 2014, 74.6% of panelists attended in person and 25.4% attended virtually. Looking only at those

⁴³ The reviewer participation data include only those panels that took place in the given fiscal year, FY 2014. Also shown is the percentage of competitively reviewed proposals with award or decline actions approved by division directors in FY 2014 that came from female PIs.

⁴⁴ Because some reviewers serve on more than one panel, this number represents 13,115 distinct individuals.

panelists for whom gender information was available, 28.3% of the panelists who attended in-person were women while 35.5% of panelists who participated virtually were women. This difference is statistically significant.⁴⁵ The difference seen in the demographics of in-person and virtual participation in mixed panels in FY 2014 is similar to what was seen in FY 2012 and FY 2013.

Both in-person and virtual panels use the Interactive Panel System (IPS). A part of FastLane, IPS permits the viewing of proposals, reviews, basic panel discussions, collaboration on panel summaries, and approval of the draft panel summary through the Web. It can also be used to support asynchronous discussions between reviewers.

As noted above, videoconferencing is used by some programs to enhance the participation of virtual panelists. Videoconferencing is also employed in award management and oversight for large center-type projects. The Foundation is continuing its efforts to improve web-based and electronic means of communication to contribute to the quality of the merit review and award oversight processes.

F. Merit Review Pilots

In addition to the forms of merit review used above, in FY 2012 – 2014, NSF conducted several pilot activities incorporating different variations of the more familiar approaches to merit review. **Table 15** lists these pilots. A brief description of each pilot follows. Proposals for pilot activities that involve deviations from established NSF policies undergo an internal review process established in FY 2012. Pilot activities that can be implemented within existing NSF policies do not require such formal review although programs are encouraged to engage the research community in advance of beginning the pilot and to notify prospective proposers of the forthcoming changes. Examples in this latter category include the use of preliminary proposals for core programs and the elimination of the use of program deadlines.

Virtual Panels

For several years, NSF has experimented with having reviewers participate “virtually” in review panel discussions, using technologies like teleconferencing, videoconferencing or “virtual worlds.”⁴⁶ In each of FY 2010 and FY 2011, approximately 1% of proposals were reviewed by wholly virtual panels. Based on that experience, NSF began planning a pilot activity to look at the challenges and impacts associated with expanding the use of virtual panels. Motivations for this included: an opportunity to attract potentially untapped reviewer pool resources by removing barriers that might hinder panelists who may not be able to travel due to physical limitations, family responsibilities, or other travel restrictions; greater opportunities to utilize international panelists who are often faced with large travel times and other restrictions; greater flexibility in how virtual panels are structured; enhanced opportunities for reviewer training; and reducing the potential impacts of inclement weather. However, there are also actual and potential challenges, including: matching technology to the size and purpose of the panel; technology stability and acceptance; security and policy issues; the possibility that panelists may be distracted by factors

⁴⁵ $p < 0.005$.

⁴⁶ An example of a virtual world technology that has been used for panel review is the Second Life system.

in their local environment; and a potential reduction in the value of panel participation to some panelists because of less opportunity to exchange ideas with colleagues. Assessing these challenges and testing approaches to them were among the reasons for implementing a pilot activity.

Table 15 – Merit Review Pilots

Pilot	Nature of pilot	Units participating
Virtual Panels	The expanded use of review panels in which all panelists participate electronically from distributed locations such as their offices or homes.	NSF-wide
Preliminary Proposals for Core Programs	Core programs move from semi-annual deadlines for full proposals to an annual deadline for preliminary proposals.	BIO/DEB, BIO/IOS
One-Plus	Investigators with promising but unfunded proposals may revise and resubmit their ideas for possible funding in the second half of the annual funding cycle, but only if invited to do so.	SBE/BCS's Geography and Spatial Sciences program
Asynchronous Reviewer Discussions	The use of an access-controlled, program director-moderated message board, open to reviewers over a specified period, to enable the sharing of comments and discussion of a set of proposals.	CISE/CNS, MPS/PHY
Mechanism Design	A review mechanism in which techniques from game theory are used to allow investigators who submit proposals also to take part in the review process.	ENG/CMMI's Sensors and Sensing Systems program
Umbrella-Amendment Solicitation	A proposal-generating mechanism that is designed to implement a community-developed infrastructure. A flexible solicitation mechanism that accommodates both overarching, long-term goals and the ability to be responsive to changing community requirements.	GEO's & CISE/ACI's EarthCube program
Elimination of Program Deadline	A core program that has traditionally had two proposal deadlines per year switched to accepting proposals at any time to see if proposal pressure would be affected.	GEO/EAR's Instrumentation and Facilities program
Electronic Polling	A web-based voting tool is employed to enable panels to conduct anonymous straw-polls.	MPS/AST

The virtual panel pilot activity began in FY 2012 with an assessment of several technological and organizational approaches to virtual meetings, the development of training modules for NSF staff and reviewers, and outreach activities with NSF staff. In FY 2013 and FY 2014, information was collected about virtual panels and the experiences of participants so that an assessment could be made in FY 2015. The expectation was that at least 15% of review panels in FY 2014 would be wholly virtual.⁴⁷ As it turned out, NSF programs embraced virtual panels to a greater degree than anticipated; 31% of panels held in FY 2014 (29% of proposal panels)

⁴⁷ See NSF's discussion of Virtual Merit Review Panels in the Performance Plan included in the President's FY 2014 budget, submitted to Congress in February, 2013.

were wholly virtual. One contributing factor may have been guidance from the Office of Management and Budget that encouraged NSF and other agencies to reduce spending on travel.

Preliminary Proposals for Core Programs

Faced with increasing proposal numbers, reviewer requirements, and declining success rates, in January 2012, two divisions in the Directorate for Biological Sciences, the Division of Environmental Biology (DEB) and the Division of Integrated Organismal Systems (IOS), embarked on a three-year pilot activity to mitigate the stresses involved. This activity replaced semi-annual, full proposal deadlines with an annual proposal submission and review process accomplished in two stages. The first stage requires 4 or 5-page preliminary proposals to be submitted each January. These are reviewed in panels and then, informed by the reviewers' input, program officers invite 15-30% of the proposers to submit full proposals by a second deadline in late summer. In the second stage, full proposals submitted in response to these invitations are reviewed in the fall by a combination of panels and ad hoc reviewers; award/decline decisions are made based on the reviews of the full proposals. This process has decreased the number of ad hoc reviewers required.

One-Plus

One of the goals of this pilot was to accelerate support for highly significant, potentially transformative research. Starting in Fall 2012, the Geography and Spatial Sciences program (GSS) moved from a semi-annual proposal deadline to accepting core research proposals only once each year, with a deadline in early September. However, reviewers were asked to explicitly comment separately on the potential larger-scale, longer-term significance of a project (as outlined in the proposal) if the project *were* to be conducted successfully, as well as the likelihood that the project (as outlined in the proposal) *would* be conducted successfully.

After funding decisions were made, program officers invited a limited number of PIs whose proposals had been declined to revise and resubmit a proposal roughly two months after they received the decline notification. This opportunity was provided based on the identification of projects whose significance and potentially transformative character were evaluated as being high. All other declined PIs had to wait until the next annual deadline for unsolicited proposals before submitting a new or revised proposal.

Proposals submitted for the secondary deadline were evaluated with ad hoc reviews complementing a panel review of the revised proposals.

Asynchronous Reviewer Discussions

This activity pilots an approach to merit review in which, after submitting written individual reviews of their assigned proposals, reviewers use an access-controlled online message board to participate in an asynchronous discussion of the merits of the proposals. The online discussion is moderated by program staff.

The approach is well known to some research communities, such as some areas of computer science that have used it extensively in the review of submissions to research conferences.

For the pilot in FY 2013, asynchronous panel discussions were used as a pre-cursor to face-to-face or virtual panel meetings. They served to identify those proposals on which there was consensus about their merit (either high or low) and to explore the reasons for divergence when individual reviewers had very different perspectives on proposals. This enabled the subsequent panel meetings to focus their time more effectively.

Using feedback from the reviewers and the program staff involved, it was concluded that the approach showed promise but that the technology used was too cumbersome in comparison to other platforms for asynchronous discussion used by the research community. Consequently no additional asynchronous reviewer discussions were scheduled in FY 2014. The pilot will be resumed in FY 2015 using a different technology, NSF's Interactive Panel System.

Mechanism Design

The Sensors and Sensing Systems program developed a merit review pilot to test the efficacy of using techniques from game theory to create a review mechanism in which the investigators who submit proposals also take part in the review process.

The mechanism design approach to proposal review is based on the mathematical theory of games, or, more precisely, reverse game theory, namely how the rules of the game should be designed in order to obtain certain desired goals. This method of review relies on ad hoc mail review of proposals with the reviewers assigned from among the set of PIs whose proposals are being reviewed. Proposals are assembled into relatively homogeneous groups of 30 - 40 proposals per group. Each proposal is assigned for review to seven otherwise non-conflicted PIs from the same group. The reviewers remain anonymous within their group and do not communicate with one another. The reviewers must provide both a written review and an ordering of the seven proposals to which they are assigned. The written review summarizes the strengths and weaknesses of the proposal as perceived by the reviewer. Based on their interpretation of the proposals they have reviewed, each reviewer is asked to provide an ordering of the proposals in what they anticipate will be the consensus ordering of the group. The score of the PI's own proposal is then supplemented with "bonus points" depending upon the degree to which his or her ranking agrees with the consensus ranking. The award of bonus points is the step that game theory suggests should provide an incentive to each reviewer to give a fair and thorough rating and ranking of the proposals to which he or she is assigned. The NSF program officer then uses the reviewers' comments, ratings and rankings as the primary input for his or her funding recommendations.

Some of the potential benefits of such an approach are:

- To reduce the submission of multiple proposals and repeated resubmission of previously declined proposals;
- To reduce the overall burden on the reviewer community;
- To improve the overall quality of the proposals submitted to the program;
- To make it easier to maintain multiple proposal submission windows per year; and
- To reduce the costs of proposal review.

This pilot activity occurred in FY 2014 using a cohort of proposals submitted in October 2013. Because of the unconventional nature of this approach, the program undertook a considerable

amount of outreach to and discussion with the research community in FY 2013. 131 projects were proposed and the program officer conducting the pilot was pleased with the quality of the reviews received. One result of this approach is that proposals received a more comprehensive review than had been previously been the norm for this program.

Umbrella-Amendment Solicitation

The EarthCube Umbrella-Amendment Solicitation is a pilot between GEO and CISE/ACI. It implements a flexible solicitation mechanism that accommodates both overarching, long-term goals, like a program announcement, and the ability to quickly respond to changing community requirements. The umbrella part of the solicitation describes the vision and reasons for the program and does not change over time. This facilitates the tracking of submissions and awards associated with the umbrella theme, and subsequent portfolio analysis, since the solicitation number remains the same. The amendment section of the solicitation specifies the funding mechanism(s) to be employed for the call, proposal due dates or submission windows, and any special review criteria and/or reporting conditions. As the EarthCube design develops with community guidance, new amendments replace old amendments. The pilot began with the EarthCube solicitation (NSF 13-529), released in December 2012. This included the Umbrella portion of the solicitation and the first Amendment section. The second Amendment was released in February 2013, the third Amendment was released in December 2013 for a March 2014 deadline date, and a fourth Amendment was released in December 2014 for a March 2015 deadline.

Elimination of Program Deadline

It has been conjectured that, in some programs, the existence of recurring proposal deadlines may increase the number of proposals submitted to the program. There are a few core programs that accept proposals at any time and their proposal load has seen less dramatic increases than is the average for NSF programs in recent years. The Division of Earth Sciences undertook an experiment in which one of its programs, which had been using two proposal deadlines per year, switched to accepting proposals without deadlines or target dates to see how proposal pressure would be affected. The final regular deadline was in July 2011. Beginning in late July 2012, proposals were accepted at any time. The year between, FY 2012, was a transition year and atypical in that, for budgetary reasons, proposals for equipment acquisition were not solicited in FY 2012. The annual numbers of proposals received before and after the transition year are shown in **Table 16**. Based on these results, the pilot is being extended to several additional programs in the Division of Earth Sciences in FY 2015.

Table 16 – Proposals received by EAR/IF before and after a transition to no deadlines

Fiscal Year⁴⁸	Proposals received
2007	177
2008	198
2009	176
2010	172
2011	173
2013	85
2014	61

Electronic Polling

NSF review panels group proposals into different categories of merit based on the panel discussion. Some panels employ a ‘straw-poll’ of panelists to get a sense of where the panel is inclined to situate a proposal. While very useful, this consumes a certain amount of time and there is a potential for inaccuracies to arise when calculating the results of the ‘straw poll’. One division experimented with the use of a web-based voting tool for panel ‘straw-polls’ as a way of reducing the time burden and improving the accuracy of the process.

G. Data on Reviewers

The Foundation maintains a central electronic database of several hundred thousand reviewers who can potentially be drawn on to participate in mail or panel reviews. Program officers frequently add new reviewers to this database. Program officers identify potential reviewers using a variety of sources including their own knowledge of the discipline, applicant suggestions, references attached to proposals, published papers, scientific citation indices and other similar databases, as well as input from other reviewers.

Type of Review

Approximately 35,097 individuals served on panels, conducted a mail review for one or more proposals, or served in both functions for proposals for which an award or decline decision was made within FY 2014. Of these individuals, approximately 13,552 (39%) served as panelists (of whom about 2,770 also served as mail reviewers) and 21,545 (61%) served as mail reviewers only. Approximately 6,633 (19%) of these reviewers had never reviewed an NSF proposal before.

⁴⁸ In the transition year, FY 2012, proposals for Acquisition or Upgrade of Research Equipment were not accepted. These normally form a large part of the IF program portfolio. Other types of proposals were accepted, including: Development of New Instrumentation, Analytical Techniques or Software, Support of National or Regional Multi-User Facilities, and Support for Early Career Investigators. Consequently, only 125 proposals were received in FY 2012.

Demographics

Reviewers were from all 50 states as well as the District of Columbia, Guam, Puerto Rico and the US Virgin Islands. Approximately 4,300 reviewers were from outside the United States by address of record.⁴⁹ Reviewers were from a range of institutions, including two-year and four-year colleges and universities, Master's level and Ph.D.-granting universities, industry, for-profit and non-profit institutions, K-12 systems, informal science institutions, and government. NSF also maintains data on numbers of reviewers from each state, territory, and country as well as by type of institution.

In FY 2014, out of a total of 35,097 distinct reviewers who returned reviews, 12,720 (36%) provided information about some aspect of gender, race, ethnicity and disability status. Of those reporting these data, 4,986 (39%) indicated that they are members of a group under-represented in science and engineering. Specifically, of the reviewers who reported some demographic data, 4,071 (32%) reported being female, 1,292 (10%) reported being from an under-represented race or ethnic minority, and 204 (1.6%) reported a disability. Of the 1,292 reviewers that reported they are from an under-represented race or ethnic group, 774 (60%) reported Hispanic or Latino, 459 (36%) reported Black or African American, 61 (4.7%) reported American Indian or Alaskan Native, and 10 (0.8%) reported Hawaiian or Pacific Islander. (Some individuals indicated that they belonged to more than one under-represented demographic group.) The provision of demographic data is voluntary and the low response rate remains a challenge.

The NSF library continually updates its resources to help NSF staff identify reviewers. This includes the collection and sharing of potential reviewer data from associations that work with under-represented groups in science and engineering. Frequent tutorials on finding reviewers are available for program officers.

Reviewers are also identified through literature searches and professional activities such as workshops and conferences. Some NSF divisions actively solicit new reviewers through their web-pages and outreach activities. To promote transparency, Chapter III.B of the *Grant Proposal Guide* describes how reviewers are selected by NSF program officers.

Participation in the peer review process is voluntary. It brings with it increased familiarity with NSF programs, knowledge of the state of research and education nationally, and increased awareness of the elements of a competitive proposal. Panelists are reimbursed for expenses, but mail reviewers receive no financial compensation. For proposals in FY 2014, NSF requested 70,368 mail reviews, of which there were 46,795 positive responses.⁵⁰ This 67% response rate in FY 2014 is similar to FY 2013's 66% rate. The response rate varies by program.

⁴⁹ In recent years, there has been a steady decline in the proportion of reviewers from outside the United States. From FY 2010, the proportion of such reviewers varied as follows: FY 2010 – 15.6%; FY 2011 – 14.3%; FY 2012 – 12.7%; FY 2013 – 12.3%; FY 2014 – 12.3%.

⁵⁰ This number tracks requests that are recorded in the Proposal and Reviewer System (PARS). For example, when potential reviewers are sent a formal invitation via eCorrespondence, the reviewer is entered in PARS. Some potential reviewers are first invited informally by email or telephone. If they decline this initial invitation, there is usually no follow-up in eCorrespondence. Numbers given here reflect the rate of positive responses to formal invitations and overestimate the practical positive response rate.

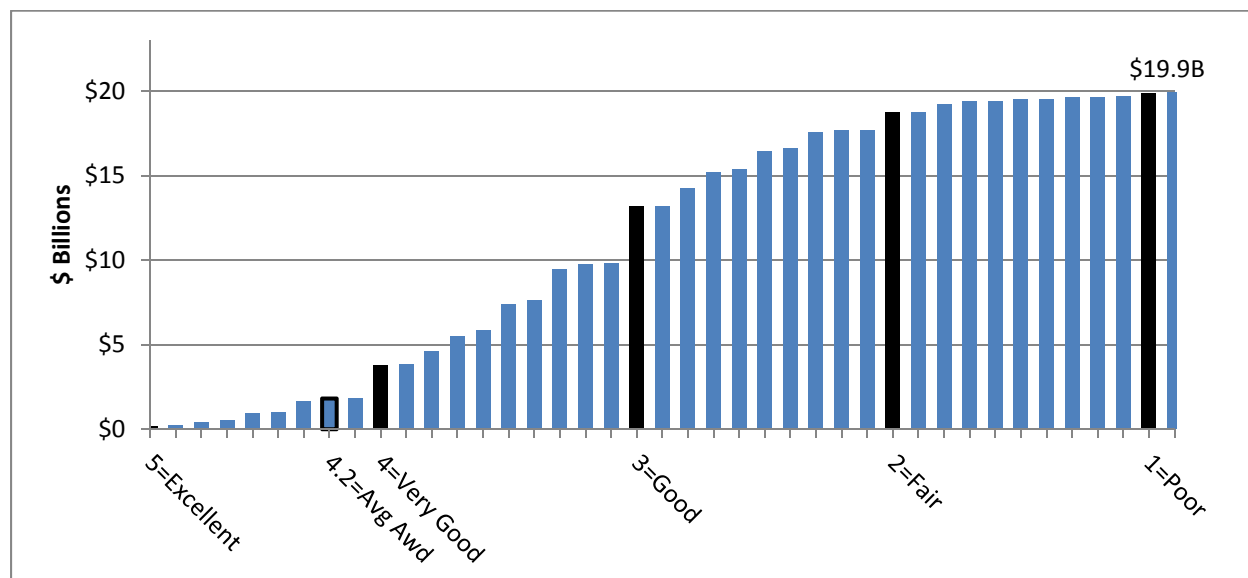
H. Reviewer Proposal Ratings and the Impact of Budget Constraints

All funded proposals are determined to be highly meritorious based on a combination of individual reviews, panel deliberations and program officer evaluations. On average, NSF proposals are reviewed by 3-5 reviewers, depending on the type of review mechanism used, although there is variation between programs. Each of the reviewers is chosen for specific types of expertise and adds different points of view to the decision-making process. The reviewers provide written reviews that describe the strengths and weaknesses of proposals in the context of the NSB merit review criteria. As explained in the previous section, many proposals are reviewed by a panel of experts. The panel ranks proposals into groups based on a discussion of the proposals. These in-depth discussions can uncover weaknesses that might not have been reflected in the initial reviews or identify strengths in proposals that might not have been rated highly by the initial reviewers.

The expertise of the NSF program officer making the final recommendation is an important voice in the process. Reviewers' numeric ratings of proposals, while a useful indicator, are not, by themselves, a robust metric of the relative merits of proposals. Program officers look not only at the ratings provided by reviewers but also weigh the *comments* that reviewers provide on the intrinsic merits of proposals. Program officers also take into consideration other factors that might not have been considered by expert reviewers. For example, proposals for innovative new ideas often use methods or techniques that might be considered risky by reviewers and panelists. Such "risky" proposals may result in transformative research that accelerates the pace of discovery. Although program officers consider concerns about risk expressed by panels, they also see the value of funding potentially transformative research. Even if the program officer decides not to fully fund the proposal, proposals that do not review well at panel due to methods that are unproven or risky, can be given small awards to allow enough work for a "proof of concept." Program officers will also consider broader impacts that might not be obvious to reviewers, such as an infrastructure need that will serve a large number of people. There are many dimensions of portfolio balance that may influence the final recommendation. Program officers strive to fund proposals from diverse institution types across all 50 states, from both young and experienced investigators.

A large number of potentially fundable proposals are declined each year. As shown in **Figure 26**, approximately \$1.82 billion was requested for declined proposals that had received ratings at least as high as the average rating (4.2 out of 5.0) for all awarded proposals. In FY 2004, the ratio of awards to such highly rated declines was 5.0:1; in FY 2014, that ratio was 4.2:1. Approximately \$3.79 billion was requested for declined proposals that were rated Very Good or higher in the merit review process. These declined proposals represent a rich portfolio of unfunded opportunities, proposals that, if funded, may have produced substantial research and education benefits.

Figure 26 - Cumulative Requested Amounts for Declined Proposals by Average Reviewer Rating for FY 2014 (dollars in billions)



Source: NSF Enterprise Information System, 10/01/14

I. Program Officer Characteristics and Workload

Table 17 shows information about NSF's program officers. The number of program officers changed from 490 in FY 2013 to 496 in FY 2014, a 1.2% increase.

Table 17 - Distribution of NSF Program Officers by Characteristics

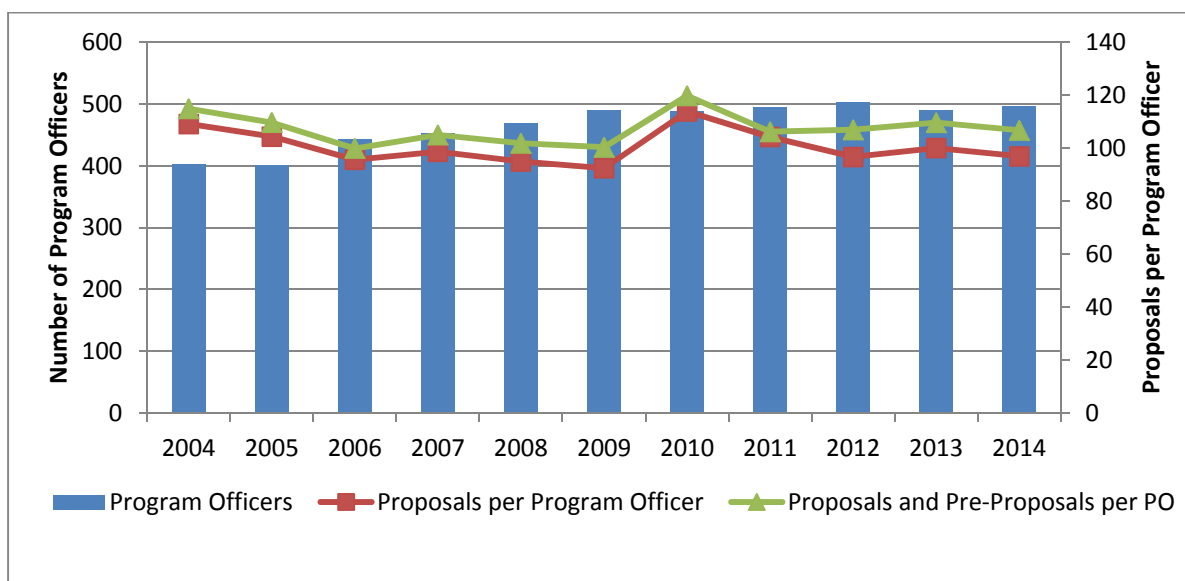
Program Officers	Total	Percent
Total	496	100%
Gender		
Male	292	59%
Female	204	41%
Race and Ethnicity		
Racial or Ethnic Minority	123	25%
Non-Minority	373	75%
Employment		
Permanent	266	54%
Visiting Scientists, Engineers & Educators (VSEE)	21	4%
Temporary	53	11%
Intergovernmental Personnel Act (IPA)	156	31%

Source: NSF Division of Human Resource Management, 03/11/15. Data are for the end of FY 2014.

Program officers can be permanent NSF employees or non-permanent employees. As shown in **Table 17**, 53.6% are permanent program officers and 46.4% are not permanent. Some non-permanent program officers are “on loan” as “Visiting Scientists, Engineers, and Educators” (VSEEs) for up to three years from their host institutions. Others are supported through grants to their home institutions under the terms of the Intergovernmental Personnel Act (IPA). In FY 2014, the number of permanent program officers decreased by 1 relative to FY 2013 while the number of IPAs increased by 4. The largest relative changes were in the proportion of VSEEs which fell from 7% to 4% of the total, and in the proportion of “Temporary Federal Employees,” which rose from 8% to 11%. Whether they are recruited as non-permanent or permanent staff members, incoming NSF program officers receive training in the merit review process. In comparison to FY 2013, the number of male program officers increased by 0.3% and the number of female program officers increased by 2.5%. The number of program officers who are from racial or ethnic minorities increased by 2.5%, while the number of non-minority program officers increased by 0.8%. At the end of FY 2014, approximately 41.1% of program officers were female and approximately 24.8% were from a racial or ethnic minority.

The annual fluctuations in the ratio of proposals to program officers are shown in **Figure 27**.

Figure 27 - Proposals per Program Officer



Source: NSF Division of Human Resource Management, 3/11/15.

There was an increase in the number of program officers in FY 2014 and a decrease from FY 2013 in the number of full proposals that were submitted. This resulted in a 3.1% decrease in proposals processed per program officer. If preliminary proposals are included in the workload, then the workload per program officer decreased by 2.6% from FY 2013 to FY 2014.

Not all individuals listed as program officers in **Table 17** process proposals, so the average proposal workload shown in **Figure 27** is an underestimate. The growing emphasis on interdisciplinary and cross-directorate programs, together with innovative approaches to encouraging transformative research proposals, has led to a growth in coordination activities.

Program officers are also tasked with an increasing number of programmatic activities, e.g., increased program accountability, training, outreach, and mentoring new staff.

In recent years, NSF has revitalized its professional development opportunities for program staff, offering in-house courses in project management, leadership, and communication through the NSF Academy. Effective August 1, 2013 (OD 13-15 Merit Review Training Requirements for New Program Officers) NSF policy requires that all new NSF program officers take Merit Review Basics Sessions I and II within 90 days of beginning work at NSF and encourages them to take the other elements of program management training, including the Program Management Seminar, within the first six months to one year. These provide an orientation to NSF and training in the merit review process.

Appendices

Appendix 1 - Proposals, Awards and Funding Rates, by Directorate or Office

		Fiscal Year										
		2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014
NSF ⁵¹	Proposals	43,851	41,722	42,352	44,577	44,428	45,181	55,542	51,562	48,613	48,999	48,051
	Awards	10,380	9,757	10,425	11,463	11,149	14,595	12,996	11,192	11,524	10,829	10,958
	<i>Omnibus</i>						9,975	12,547				
	<i>ARRA</i>						4,620	449				
	Funding Rate	24%	23%	25%	26%	25%	32%	23%	22%	24%	22%	23%
BIO	Proposals	6,063	6,475	6,617	6,728	6,598	6,578	8,059	7,439	5,269	5,934	4,784
	Awards	1,432	1,355	1,202	1,303	1,291	1,823	1,556	1,310	1,293	1,250	1,272
	<i>Omnibus</i>						1,261	1,476				
	<i>ARRA</i>						562	80				
	Funding Rate	24%	21%	18%	19%	20%	28%	19%	18%	25%	21%	27%
CISE	Proposals	6,496	5,354	4,973	6,048	6,067	6,001	7,317	6,702	7,703	7,821	7,434
	Awards	1,064	1,163	1,322	1,699	1,449	1,926	1,755	1,527	1,749	1,616	1,680
	<i>Omnibus</i>						1,452	1,723				
	<i>ARRA</i>						474	32				
	Funding Rate	16%	22%	27%	28%	24%	32%	24%	23%	23%	21%	23%
EHR	Proposals	4,644	3,699	3,254	4,248	3,887	3,699	5,055	4,660	4,281	4,501	4,049
	Awards	925	736	824	903	1,111	1,009	930	807	889	793	701
	<i>Omnibus</i>						919	908				
	<i>ARRA</i>						90	22				
	Funding Rate	20%	20%	25%	21%	29%	27%	18%	17%	21%	18%	17%
ENG	Proposals	8,994	8,692	9,423	9,574	9,643	10,611	13,226	12,314	11,338	10,738	11,878
	Awards	1,753	1,493	1,730	1,955	1,966	2,688	2,375	2,064	2,065	2,212	2,145
	<i>Omnibus</i>						1,771	2,321				
	<i>ARRA</i>						917	54				
	Funding Rate	19%	17%	18%	20%	20%	25%	18%	17%	18%	21%	18%
GEO	Proposals	4,956	5,492	5,378	5,567	5,101	4,991	5,614	5,187	5,243	6,087	5,790
	Awards	1,687	1,596	1,656	1,711	1,563	2,226	1,970	1,705	1,637	1,565	1,487
	<i>Omnibus</i>						1,152	1,917				
	<i>ARRA</i>						1,074	53				
	Funding Rate	34%	29%	31%	31%	31%	45%	35%	31%	31%	26%	26%

⁵¹ Several organizational changes occurred over the decade. Data from prior years have been realigned with the organizational structure in effect for FY 2013 in order to show historical trends. The Office of Cyberinfrastructure (OCI) was created in July 2005 from what had previously been the Division of Shared Cyberinfrastructure (SCI) in CISE. In FY 2007, management of the EPSCoR program was transferred from EHR to OIA. A realignment was implemented in FY 2013 that moved the Office of Polar Programs (OPP) and OCI from the Office of the Director to GEO and CISE, respectively, preserving their identity as separate divisions. Additionally, the Office of International Science & Engineering (OISE) and Office of Integrative Activities (OIA) became the Office of International and Integrative Activities (IIA). See **Appendix 21**.

		Fiscal Year										
		2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014
IIA	Proposals	895	838	721	803	931	890	1,242	1,352	995	582	755
	Awards	405	339	326	379	374	464	484	429	347	272	336
	<i>Omnibus</i>						360	424				
	<i>ARRA</i>						104	60				
	Funding Rate	45%	40%	45%	47%	40%	52%	39%	31%	35%	47%	45%
MPS	Proposals	7,184	7,083	7,466	7,315	7,837	7,883	9,411	8,796	9,006	8,903	8,855
	Awards	2,175	2,071	2,221	2,360	2,269	3,122	2,669	2,352	2,523	2,201	2,343
	<i>Omnibus</i>						2,004	2,529				
	<i>ARRA</i>						1,118	140				
	Funding Rate	30%	29%	30%	32%	29%	40%	28%	27%	28%	25%	26%
SBE	Proposals	4,619	4,089	4,520	4,284	4,364	4,525	5,618	5,112	4,776	4,433	4,506
	Awards	939	1,004	1,144	1,143	1,126	1,337	1,257	998	1,019	920	994
	<i>Omnibus</i>						1,056	1,249				
	<i>ARRA</i>						281	8				
	Funding Rate	20%	25%	25%	27%	26%	30%	22%	20%	21%	21%	22%
Other ⁵²	Proposals				10		3			2		
	Awards				10		0			2		
	<i>Omnibus</i>											
	<i>ARRA</i>											
	Funding Rate				100%		0%			100%		

Source: NSF Enterprise Information System, 10/01/14.

⁵² The 'Other' category includes, for example, non-contract awards made on behalf of the Office of the Inspector-General. The following are not included in the FY 2014 statistics: 5,696 Continuing Grant Increments, 3,053 Supplements, and 116 Contracts.

Appendix 2 - Preliminary Proposals

Several NSF programs utilize preliminary proposals in an effort to limit the workload of PIs and to increase the quality of full proposals. The annual number of preliminary proposals varies considerably as a result of competitions being held in a given year. For some programs, preliminary proposals are externally reviewed; other programs provide internal review only.

Decisions regarding preliminary proposals may be non-binding or binding. Non-binding decisions regarding preliminary proposals are recommendations; a PI may choose to submit a full proposal even if it has been discouraged. Binding decisions, however, are restrictive in that full proposals are only accepted from PIs that are invited to submit them. In general, programs obtain advice from external peer reviewers before making binding decisions about preliminary proposals.

Number of Preliminary Proposals and Subsequent Actions

Fiscal Year	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014
Total # Preliminary Proposals	2,310	2,120	1,874	2,842	3,203	3,856	2,883	965	5,135	4,691	4,911
Non-Binding (NB) Total*	1,412	1,302	1,279	1,540	669	1,140	1,384	357	459	457	92
NB Encouraged	544	512	509	662	333	519	636	128	222	296	29
NB Discouraged	868	790	770	878	336	621	748	229	237	161	63
Binding Total*	892	816	594	1,301	2,534	2,500	1,273	572	4,484	4,087	4,761
Binding Invite	221	246	136	252	572	685	372	245	1,236	942	1,083
Binding Non-invite	671	570	458	1,049	1,962	1,815	901	327	3,248	3,145	3,678

Source: NSF Report Server, 12/8/14.

In FY 2012, the Directorate for Biological Sciences instituted a new requirement that PIs who wished to submit full proposals to the Divisions of Environmental Biology and Integrative Organismal Systems, in response to core program solicitations, the Research at Undergraduate Institutions solicitation, or the Long-term Research in Environmental Biology solicitation, must first submit a preliminary proposal.

* Non-binding and binding totals do not include preliminary proposals that have been withdrawn or returned without review.

Appendix 3 – Proposals, Awards and Success Rates, by PI Demographics*

Table 3.1 - FY2014 Competitive Proposals, Awards and Success Rates, by PI Gender

Directorate		Total	Female	Male	Unknown
NSF	Proposals	48,051	11,142	31,625	5,284
	% of Total		23%	66%	11%
	Awards	10,958	2,669	7,286	1,003
	Funding Rate	23%	24%	23%	19%
BIO	Proposals	4,784	1,370	3,033	381
	% of Total		29%	63%	8%
	Awards	1,272	362	820	90
	Funding Rate	27%	26%	27%	24%
CSE	Proposals	7,434	1,368	5,287	779
	% of Total		18%	71%	10%
	Awards	1,680	326	1,176	178
	Funding Rate	23%	24%	22%	23%
EHR	Proposals	4,049	1,612	1,862	575
	% of Total		40%	46%	14%
	Awards	701	274	338	89
	Funding Rate	17%	17%	18%	15%
ENG	Proposals	11,878	2,024	8,460	1,394
	% of Total		17%	71%	12%
	Awards	2,145	436	1,485	224
	Funding Rate	18%	22%	18%	16%
GEO	Proposals	5,790	1,503	3,809	478
	% of Total		26%	66%	8%
	Awards	1,487	386	1,000	101
	Funding Rate	26%	26%	26%	21%
IIA	Proposals	755	243	386	126
	% of Total		32%	51%	17%
	Awards	336	119	162	55
	Funding Rate	45%	49%	42%	44%
MPS	Proposals	8,855	1,510	6,487	858
	% of Total		17%	73%	10%
	Awards	2,343	427	1,758	158
	Funding Rate	26%	28%	27%	18%
SBE	Proposals	4,506	1,512	2,301	693
	% of Total		34%	51%	15%
	Awards	994	339	547	108
	Funding Rate	22%	22%	24%	16%

Source: NSF Enterprise Information System, 10/1/14.

*Demographic data are voluntarily self-reported by the PI. In FY2014, approximately 89% of proposals were from PIs who provided gender information and approximately 90.5% from PIs who provided some information on ethnicity or race.

Table 3.2 – FY 2014 Competitive Proposals, Awards and Success Rates, by PI Race and Ethnicity

		Total*	Hispanic	American Indian/ Alaskan	Asian	Black/ African- American	Multi- Racial	Native Hawaiian/ Pac Island	White	Unknown
NSF	Proposals	48,051	1,921	103	10,538	1,123	425	30	29,624	6,208
	% of Total		4%	0%	22%	2%	1%	0%	62%	13%
	Awards	10,958	411	36	1,925	204	114	5	7,390	1,284
	Funding Rate	23%	21%	35%	18%	18%	27%	17%	25%	21%
BIO	Proposals	4,784	222	14	485	65	57	4	3,699	460
	% of Total		5%	0%	10%	1%	1%	0%	77%	10%
	Awards	1,272	55	†	104	11	22	†	1,009	116
	Funding Rate	27%	25%	†	21%	17%	39%	†	27%	25%
CSE	Proposals	7,434	221	5	2,592	123	47	5	3,657	1,005
	% of Total		3%	0%	35%	2%	1%	0%	49%	14%
	Awards	1,680	38	†	496	27	9	†	903	243
	Funding Rate	23%	17%	†	19%	22%	19%	†	25%	24%
EHR	Proposals	4,049	170	15	438	308	43	3	2,616	626
	% of Total		4%	0%	11%	8%	1%	0%	65%	15%
	Awards	701	24	†	67	53	7	†	470	100
	Funding Rate	17%	14%	†	15%	17%	16%	†	18%	16%
ENG	Proposals	11,878	483	26	3,952	299	84	2	5,921	1,594
	% of Total		4%	0%	33%	3%	1%	0%	50%	13%
	Awards	2,145	96	†	609	39	17	†	1,203	270
	Funding Rate	18%	20%	†	15%	13%	20%	†	20%	17%
GEO	Proposals	5,790	214	11	597	42	56	9	4,486	589
	% of Total		4%	0%	10%	1%	1%	0%	77%	10%
	Awards	1,487	48	†	120	10	21	†	1,192	136
	Funding Rate	26%	22%	†	20%	24%	38%	†	27%	23%
IIA	Proposals	755	43	2	104	37	16	3	462	131
	% of Total		6%	0%	14%	5%	2%	1%	61%	17%
	Awards	336	21	†	36	15	8	†	218	56
	Funding Rate	45%	49%	†	35%	41%	50%	†	47%	43%
MPS	Proposals	8,855	347	11	2,006	125	70	4	5,636	1,003
	% of Total		4%	0%	23%	1%	1%	0%	64%	11%
	Awards	2,343	91	†	441	35	18	†	1,640	209
	Funding Rate	26%	26%	†	22%	28%	26%	†	29%	21%
SBE	Proposals	4,506	221	19	364	124	52	0	3,147	800
	% of Total		5%	0%	8%	3%	1%	0%	70%	18%
	Awards	994	38	†	52	14	12	0	755	154
	Funding Rate	22%	17%	†	14%	11%	23%	N/A	24%	19%

Source: NSF Enterprise Information System, 10/1/14. * “Total” is count of unique proposals. Columns are counts of proposals from PIs in the corresponding category. Hispanic individuals are also included in one of the racial categories. † indicates that data are omitted to reduce the likelihood of identifying individual investigators.

Table 3.3 - FY2014 Research Proposals, Awards and Success Rates, by PI Gender

Directorate		Total	Female	Male	Unknown
NSF	Proposals	38,882	8,676	26,397	3,809
	% of Total		22%	68%	10%
	Awards	7,923	1,833	5,466	624
	Funding Rate	20%	21%	21%	16%
BIO	Proposals	3,826	1,061	2,461	304
	% of Total		28%	64%	8%
	Awards	942	254	624	64
	Funding Rate	25%	24%	25%	21%
CSE	Proposals	7,092	1,296	5,049	747
	% of Total		18%	71%	11%
	Awards	1,405	263	990	152
	Funding Rate	20%	20%	20%	20%
EHR	Proposals	2,011	891	843	277
	% of Total		44%	42%	14%
	Awards	254	122	105	27
	Funding Rate	13%	14%	12%	10%
ENG	Proposals	9,253	1,620	6,887	746
	% of Total		18%	74%	8%
	Awards	1,496	314	1,086	96
	Funding Rate	16%	19%	16%	13%
GEO	Proposals	5,304	1,355	3,531	418
	% of Total		26%	67%	8%
	Awards	1,266	311	875	80
	Funding Rate	24%	23%	25%	19%
IIA	Proposals	461	139	246	76
	% of Total		30%	53%	16%
	Awards	88	31	48	9
	Funding Rate	19%	22%	20%	12%
MPS	Proposals	7,732	1,249	5,739	744
	% of Total		16%	74%	10%
	Awards	1,854	319	1,403	132
	Funding Rate	24%	26%	24%	18%
SBE	Proposals	3,203	1,065	1,641	497
	% of Total		33%	51%	16%
	Awards	618	219	335	64
	Funding Rate	19%	21%	20%	13%

Source: NSF Enterprise Information System, 10/1/14.

Table 3.4 – FY 2014 Research Proposals, Awards and Success Rates, by PI Race and Ethnicity

		Total*	Hispanic	American Indian/ Alaskan	Asian	Black/ African-American	Multi-Racial	Native Hawaiian/ Pac Island	White	Unknown
NSF	Proposals	38,882	1,557	73	9,248	747	337	22	23,859	4,596
	% of Total		4%	0%	24%	2%	1%	0%	61%	12%
	Awards	7,923	278	19	1,511	93	78	2	5,381	839
	Funding Rate	20%	18%	26%	16%	12%	23%	9%	23%	18%
BIO	Proposals	3,826	168	9	440	51	43	2	2,920	361
	% of Total		4%	0%	11%	1%	1%	0%	76%	9%
	Awards	942	31	†	86	6	16	†	745	84
	Funding Rate	25%	18%	†	20%	12%	37%	†	26%	23%
CSE	Proposals	7,092	216	4	2,488	111	46	5	3,483	955
	% of Total		3%	0%	35%	2%	1%	0%	49%	13%
	Awards	1,405	34	†	418	16	9	†	759	202
	Funding Rate	20%	16%	†	17%	14%	20%	†	22%	21%
EHR	Proposals	2,011	98	6	168	118	20	3	1,372	324
	% of Total		5%	0%	8%	6%	1%	0%	68%	16%
	Awards	254	7	†	17	11	0	†	191	34
	Funding Rate	13%	7%	†	10%	9%	0%	†	14%	10%
ENG	Proposals	9,253	376	19	3,378	234	64	1	4,611	946
	% of Total		4%	0%	37%	3%	1%	0%	50%	10%
	Awards	1,496	67	†	455	23	12	†	864	137
	Funding Rate	16%	18%	†	13%	10%	19%	†	19%	14%
GEO	Proposals	5,304	200	9	557	32	52	8	4,125	521
	% of Total		4%	0%	11%	1%	1%	0%	78%	10%
	Awards	1,266	39	†	104	6	19	†	1,021	111
	Funding Rate	24%	20%	†	19%	19%	37%	†	25%	21%
IIA	Proposals	461	26	0	72	19	7	1	281	81
	% of Total		6%	0%	16%	4%	2%	1%	61%	18%
	Awards	88	4	0	10	3	0	†	66	9
	Funding Rate	19%	15%	N/A	14%	16%	0%	†	23%	11%
MPS	Proposals	7,732	303	10	1,846	91	61	2	4,860	862
	% of Total		4%	0%	24%	1%	1%	0%	63%	11%
	Awards	1,854	72	†	378	19	14	†	1,268	175
	Funding Rate	24%	24%	†	20%	21%	23%	†	26%	20%
SBE	Proposals	3,203	170	16	299	91	44	0	2,207	546
	% of Total		5%	0%	9%	3%	1%	0%	69%	17%
	Awards	618	24	†	43	9	8	0	467	87
	Funding Rate	19%	14%	†	14%	10%	18%	N/A	21%	16%

Source: NSF Enterprise Information System, 10/1/14. * "Total" is count of unique proposals. Columns are counts of proposals from PIs in the corresponding category. Hispanic individuals are also included in one of the racial categories. † indicates that data are omitted to reduce the likelihood of identifying individual investigators.

Appendix 4 – Proposal Success Rates of New PIs and Prior PIs, by Directorate or Office

		2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014
New PIs <i>Former Definition</i>	BIO	18%	15%	14%	14%	15%	23%	14%	12%	18%	16%	20%
	CISE	13%	15%	19%	22%	18%	25%	18%	18%	16%	15%	17%
	EHR	15%	16%	21%	17%	23%	21%	14%	13%	16%	13%	14%
	ENG	15%	13%	15%	17%	16%	21%	14%	13%	13%	17%	14%
	GEO	27%	24%	23%	23%	23%	33%	26%	24%	21%	20%	20%
	IIA	35%	40%	43%	44%	36%	55%	38%	29%	34%	54%	48%
	MPS	21%	20%	19%	20%	19%	29%	17%	17%	17%	15%	18%
	SBE	15%	18%	18%	20%	20%	21%	16%	14%	16%	15%	17%
New PIs <i>Revised Definition*</i>	BIO	17%	15%	14%	14%	15%	23%	14%	12%	18%	16%	20%
	CISE	13%	16%	18%	21%	18%	26%	19%	18%	17%	16%	18%
	EHR	14%	15%	20%	16%	22%	20%	13%	12%	16%	12%	13%
	ENG	15%	14%	15%	17%	16%	21%	13%	13%	14%	18%	15%
	GEO	27%	22%	23%	22%	22%	32%	26%	25%	20%	21%	20%
	IIA	36%	40%	43%	44%	35%	55%	38%	29%	34%	56%	49%
	MPS	21%	20%	19%	20%	19%	29%	18%	17%	18%	16%	18%
	SBE	15%	18%	18%	21%	20%	22%	17%	14%	16%	16%	18%
Prior PIs <i>Former Definition</i>	BIO	28%	25%	21%	24%	23%	32%	23%	21%	29%	25%	31%
	CISE	19%	26%	32%	32%	27%	35%	27%	25%	26%	23%	25%
	EHR	23%	24%	29%	25%	35%	34%	23%	22%	26%	22%	21%
	ENG	23%	20%	21%	23%	24%	29%	22%	20%	22%	23%	21%
	GEO	36%	31%	34%	34%	34%	49%	39%	37%	36%	28%	28%
	IIA	55%	47%	52%	56%	57%	47%	42%	39%	37%	32%	37%
	MPS	36%	35%	37%	40%	35%	47%	36%	33%	35%	32%	32%
	SBE	26%	32%	32%	35%	32%	39%	30%	26%	27%	27%	27%
Prior PIs <i>Revised Definition*</i>	BIO	28%	25%	21%	23%	23%	31%	23%	21%	28%	24%	30%
	CISE	18%	25%	31%	31%	26%	34%	26%	24%	25%	22%	24%
	EHR	23%	24%	28%	24%	34%	33%	22%	21%	24%	21%	20%
	ENG	23%	19%	21%	23%	23%	28%	21%	19%	21%	23%	20%
	GEO	36%	31%	33%	33%	33%	49%	38%	35%	35%	27%	28%
	IIA	54%	44%	52%	54%	57%	48%	41%	38%	35%	31%	35%
	MPS	35%	34%	36%	39%	34%	46%	35%	32%	33%	29%	31%
	SBE	25%	32%	32%	33%	32%	38%	29%	25%	28%	27%	27%

Source: NSF Enterprise Information System 10/01/14.

* In FY 2009, in conjunction with NSF's implementation of the American Recovery and Reinvestment Act, NSF revised its definition of a new PI to, "A new PI is an individual who has not served as the PI or Co-PI on any award from NSF (with the exception of doctoral dissertation awards, graduate or postdoctoral fellowships, research planning grants, or conferences, symposia and workshop grants.)" Previously, a new PI was considered to be any individual who had not previously been a PI on any NSF award.

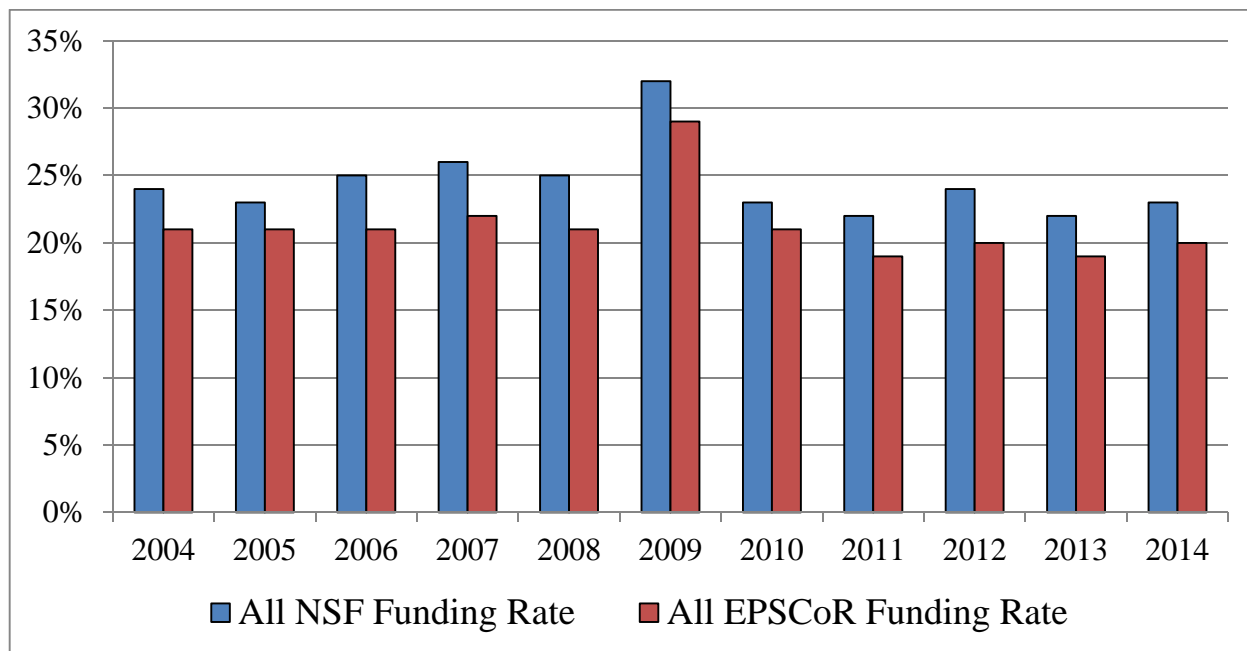
Appendix 5 - EPSCoR: Jurisdictions, Proposal, Award, and Funding Data

Twenty-eight states, the Commonwealth of Puerto Rico, Guam and the U.S. Virgin Islands were eligible to participate in aspects of the NSF Experimental Program to Stimulate Competitive Research (EPSCoR) program in FY 2014. The states are: Alabama, Alaska, Arkansas, Delaware, Hawaii, Idaho, Iowa, Kansas, Kentucky, Louisiana, Maine, Mississippi, Missouri, Montana, Nebraska, Nevada, New Hampshire, New Mexico, North Dakota, Oklahoma, Rhode Island, South Carolina, South Dakota, Tennessee, Utah, Vermont, West Virginia, and Wyoming. For three of the 28 states, Iowa, Tennessee, and Utah, the prior 3-year rolling average of NSF research funds received was over 0.75% of NSF's Research and Related Activities budget and these jurisdictions were not eligible to participate in new Research Infrastructure Improvement initiatives in FY 2014.

In FY 2014, the NSF EPSCoR program invested \$25.0 million in co-funding 184 NSF awards. This investment was leveraged with \$38.8 million from NSF Directorates and other Offices for a total investment of \$63.8 million. Since 1998, when the co-funding initiative was formally established, approximately 3950 co-funded awards have been made. The latter represent a total NSF investment of about \$1.5 billion of which \$569 million was co-funding provided by the EPSCoR program.

Figure 5.1 shows the change over time for the proposal success rate of EPSCoR jurisdictions relative to the overall proposal success rate for all of the United States.

Figure 5.1 - Overall Proposal Success Rates for EPSCoR Jurisdictions and Overall NSF Proposal Success Rates



Source: EPSCoR Office 3/23/15.

Table 5.1 shows the number of proposals, awards, and proposal success rates for EPSCoR jurisdictions. Below the name of the EPSCoR jurisdiction is the year in which the jurisdiction joined EPSCoR.

Table 5.1 – Proposal Success Rates, by EPSCoR Jurisdiction
(Date under the state name is year state joined EPSCoR)

		2005	2006	2007	2008	2009	2010	2011	2012	2013	2014
All NSF	Awards	9,757	10,425	11,463	11,149	14,595	12,996	11,192	11,524	10,829	10,958
	Proposals	41,722	42,352	44,577	44,428	45,181	55,542	51,562	48,613	48,999	48,051
	Funding Rate	23%	25%	26%	25%	32%	23%	22%	24%	22%	23%
All EPSCoR Jurisdictions	Awards	1,433	1,489	1,653	1,564	2,474	2,181	1,846	1,960	1,897	1,892
	Proposals	6,802	7,037	7,392	7,349	8,476	10,513	9,640	9,680	9,766	9,477
	Funding Rate	21%	21%	22%	21%	29%	21%	19%	20%	19%	20%
Alabama -1985	Awards	78	84	86	85	148	119	98	110	94	102
	Proposals	483	530	508	489	606	708	614	669	647	665
	Funding Rate	16%	16%	17%	17%	24%	17%	16%	16%	15%	15%
Alaska -2000	Awards	52	63	75	52	77	65	71	65	60	50
	Proposals	203	209	246	204	186	235	213	199	221	205
	Funding Rate	26%	30%	30%	25%	41%	28%	33%	33%	27%	24%
Arkansas -1980	Awards	29	47	58	36	41	60	40	33	46	33
	Proposals	191	209	244	197	194	276	246	229	260	207
	Funding Rate	15%	22%	24%	18%	21%	22%	16%	14%	18%	16%
Delaware -2003	Awards	54	50	67	68	77	80	70	79	70	67
	Proposals	254	247	283	283	244	295	292	278	287	283
	Funding Rate	21%	20%	24%	24%	32%	27%	24%	28%	24%	24%
Guam -2012	Awards	N/A	1	0	2	0	2	2	2	1	0
	Proposals	N/A	1	2	5	3	7	5	8	7	4
	Funding Rate	N/A	100%	0%	40%	0%	29%	40%	25%	14%	0%
Hawaii -2001	Awards	89	77	74	73	109	99	80	60	54	68
	Proposals	265	240	276	276	277	379	285	281	282	294
	Funding Rate	34%	32%	27%	26%	39%	26%	28%	21%	19%	23%
Idaho -1987	Awards	31	29	34	44	44	35	37	47	41	35
	Proposals	140	148	161	201	168	199	202	185	214	230
	Funding Rate	22%	20%	21%	22%	26%	18%	18%	25%	19%	15%
Iowa -2009	Awards	106	109	99	132	142	136	114	116	113	116
	Proposals	501	524	491	524	564	661	613	558	566	524
	Funding Rate	21%	21%	20%	25%	25%	21%	19%	21%	20%	22%
Kansas -1992	Awards	88	76	78	82	88	92	88	91	65	67
	Proposals	367	393	404	387	399	464	423	402	393	389
	Funding Rate	24%	19%	19%	21%	22%	20%	21%	23%	17%	17%

		2005	2006	2007	2008	2009	2010	2011	2012	2013	2014
Kentucky -1985	Awards	62	52	60	62	78	81	64	63	58	68
	Proposals	307	293	330	300	356	429	437	434	391	401
	Funding Rate	20%	18%	18%	21%	22%	17%	15%	15%	15%	17%
Louisiana -1987	Awards	100	117	96	98	132	149	102	88	91	74
	Proposals	514	548	495	471	583	715	621	484	463	402
	Funding Rate	19%	21%	19%	21%	27%	21%	16%	18%	20%	18%
Maine -1980	Awards	50	36	58	65	60	58	42	46	52	48
	Proposals	192	181	200	199	172	190	209	182	211	201
	Funding Rate	26%	20%	29%	33%	35%	31%	20%	25%	25%	24%
Mississippi -1987	Awards	32	48	40	34	76	72	42	43	28	32
	Proposals	226	293	251	271	301	358	287	264	262	260
	Funding Rate	14%	16%	16%	13%	25%	20%	15%	16%	11%	12%
Missouri -2012	Awards	137	150	146	160	180	144	135	136	139	114
	Proposals	702	693	742	699	713	795	727	715	716	636
	Funding Rate	20%	22%	20%	23%	25%	18%	19%	19%	19%	18%
Montana -1980	Awards	43	52	61	57	78	51	35	50	50	45
	Proposals	193	242	238	232	207	251	222	204	214	183
	Funding Rate	22%	21%	26%	25%	38%	20%	16%	25%	23%	25%
Nebraska -1992	Awards	41	59	51	54	64	56	60	40	59	51
	Proposals	226	238	250	255	248	324	309	258	305	281
	Funding Rate	18%	25%	50%	21%	26%	17%	19%	16%	19%	18%
Nevada -1985	Awards	40	42	50	43	61	39	37	29	33	58
	Proposals	203	200	231	261	232	295	263	236	217	245
	Funding Rate	20%	21%	22%	16%	26%	13%	14%	12%	15%	24%
New Hampshire -2004	Awards	64	53	60	58	108	76	61	75	64	64
	Proposals	280	243	240	230	251	311	282	280	273	295
	Funding Rate	23%	22%	25%	25%	43%	24%	22%	27%	23%	22%
New Mexico -2001	Awards	80	91	104	102	115	105	91	69	81	76
	Proposals	352	348	401	444	389	506	416	399	404	398
	Funding Rate	23%	26%	26%	23%	30%	21%	22%	17%	20%	19%
North Dakota -1985	Awards	19	22	15	19	31	35	23	18	21	26
	Proposals	154	170	139	158	141	171	161	161	172	174
	Funding Rate	12%	13%	11%	12%	22%	20%	14%	11%	12%	15%
Oklahoma -1985	Awards	55	74	66	67	112	74	79	68	59	69
	Proposals	327	342	338	378	420	457	460	384	394	339
	Funding Rate	17%	22%	20%	18%	27%	16%	17%	18%	15%	20%
Puerto Rico -1985	Awards	16	19	32	24	37	34	19	9	8	16
	Proposals	119	140	153	148	183	203	163	153	105	86
	Funding Rate	13%	14%	21%	16%	20%	17%	12%	6%	8%	19%

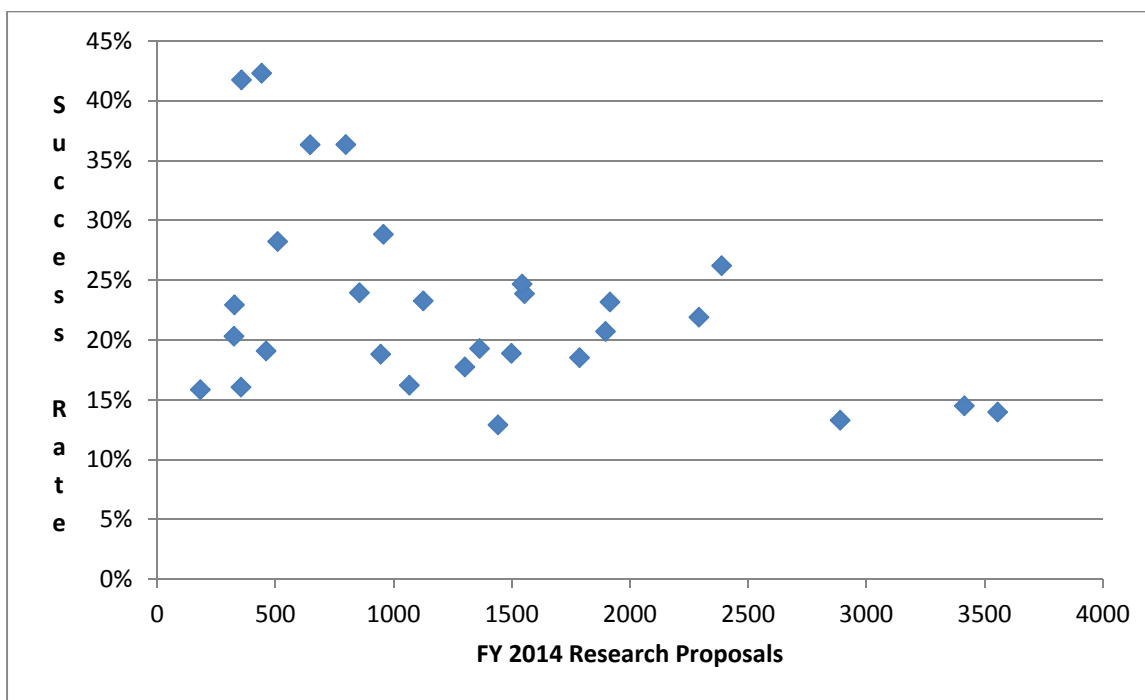
		2005	2006	2007	2008	2009	2010	2011	2012	2013	2014
Rhode Island -2004	Awards	117	140	127	129	176	148	131	146	127	138
	Proposals	334	353	390	357	350	442	400	393	399	404
	Funding Rate	35%	40%	33%	36%	50%	33%	33%	37%	32%	34%
South Carolina -1980	Awards	90	86	122	87	152	136	108	117	115	97
	Proposals	453	464	523	470	527	671	650	562	594	585
	Funding Rate	20%	19%	23%	19%	29%	20%	17%	21%	19%	17%
South Dakota -1987	Awards	21	14	21	20	31	33	24	20	28	32
	Proposals	101	97	97	116	132	184	162	150	163	135
	Funding Rate	21%	14%	22%	17%	23%	18%	15%	13%	17%	24%
Tennessee -2004	Awards	113	99	145	124	183	133	138	144	144	136
	Proposals	585	564	642	633	608	759	709	687	667	696
	Funding Rate	19%	18%	23%	20%	30%	18%	19%	21%	22%	20%
U.S. Virgin Islands -2002	Awards	2	1	0	2	0	1	3	2	0	2
	Proposals	5	6	4	5	1	3	11	5	8	7
	Funding Rate	40%	17%	0%	40%	10%	33%	27%	40%	0%	29%
Utah -2009	Awards	106	94	95	111	135	129	115	118	135	137
	Proposals	474	466	449	492	464	595	596	532	569	554
	Funding Rate	22%	20%	21%	23%	29%	22%	19%	21%	24%	25%
Vermont -1985	Awards	22	16	26	27	42	23	22	24	21	22
	Proposals	129	119	129	144	120	126	121	90	89	104
	Funding Rate	17%	13%	20%	19%	35%	18%	18%	27%	24%	21%
West Virginia -1980	Awards	16	19	21	25	33	27	21	32	22	23
	Proposals	100	121	128	119	130	160	151	163	158	159
	Funding Rate	16%	16%	16%	21%	25%	17%	14%	20%	14%	14%
Wyoming -1985	Awards	29	23	26	27	44	35	31	20	18	24
	Proposals	99	99	91	121	123	146	122	105	115	129
	Funding Rate	29%	23%	29%	22%	36%	24%	25%	19%	16%	19%

Source: All-NSF data - NSF Enterprise Information System, 10/1/14; EPSCoR jurisdiction data - NSF Budget Internet Information System, 03/23/15.

Appendix 6 - Submitted Research Proposals and Success Rates, by Division

Figure 6.1 shows a scatter plot of the NSF divisions along axes corresponding to the number of research proposals acted on and the success rate, for FY 2014. Excluded from this plot are the Division of Graduate Education (DGE), the Division of Human Resource Development (HRD) and the Division of Undergraduate Education (DUE) as these receive and fund many non-research proposals. The Division of Research on Learning in Formal and Informal Settings (DRL) is included. Several units that handle proposals in a way similar to divisions are included as separate entities. These are Emerging Frontiers (EF) in the Directorate for Biological Sciences, Emerging Frontiers in Research and Innovation (EFRI) in the Directorate for Engineering, the Office of Multidisciplinary Activities (SMA) in the Directorate for Social, Behavioral, and Economic Sciences, and the Office of International and Integrative Activities (IIA) in the Office of the Director.

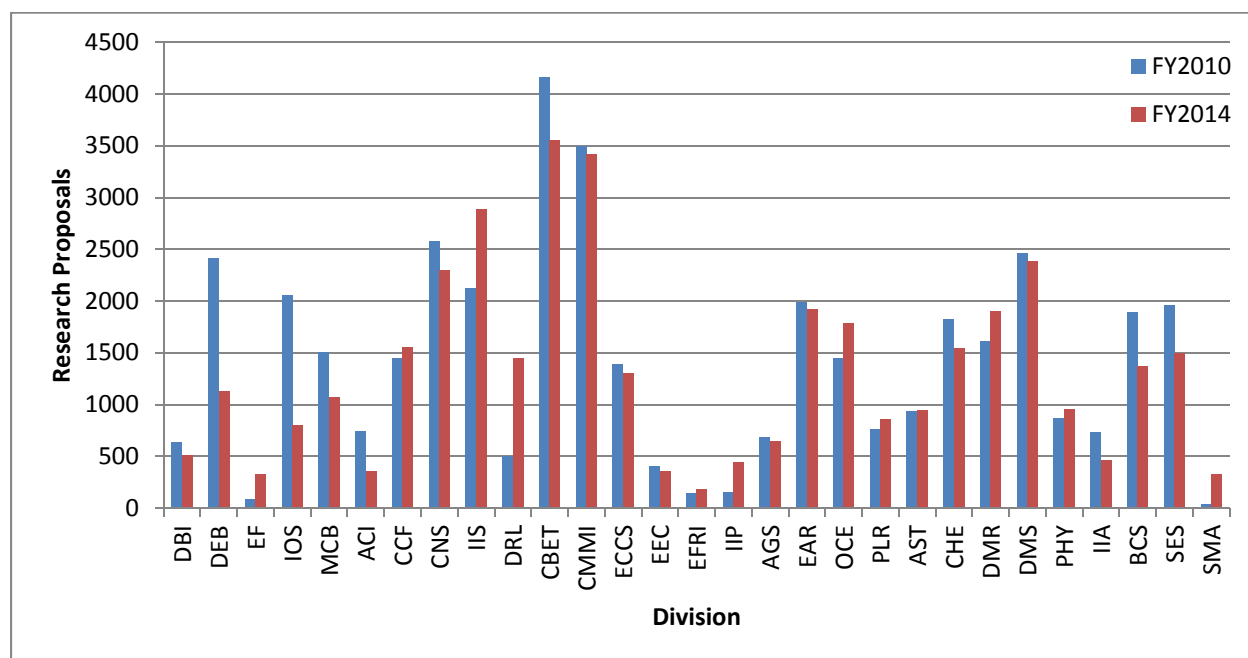
Figure 6.1 – FY 2014 Research Proposals and Success Rates, by Division



Source: NSF Enterprise Information System, 10/10/14.

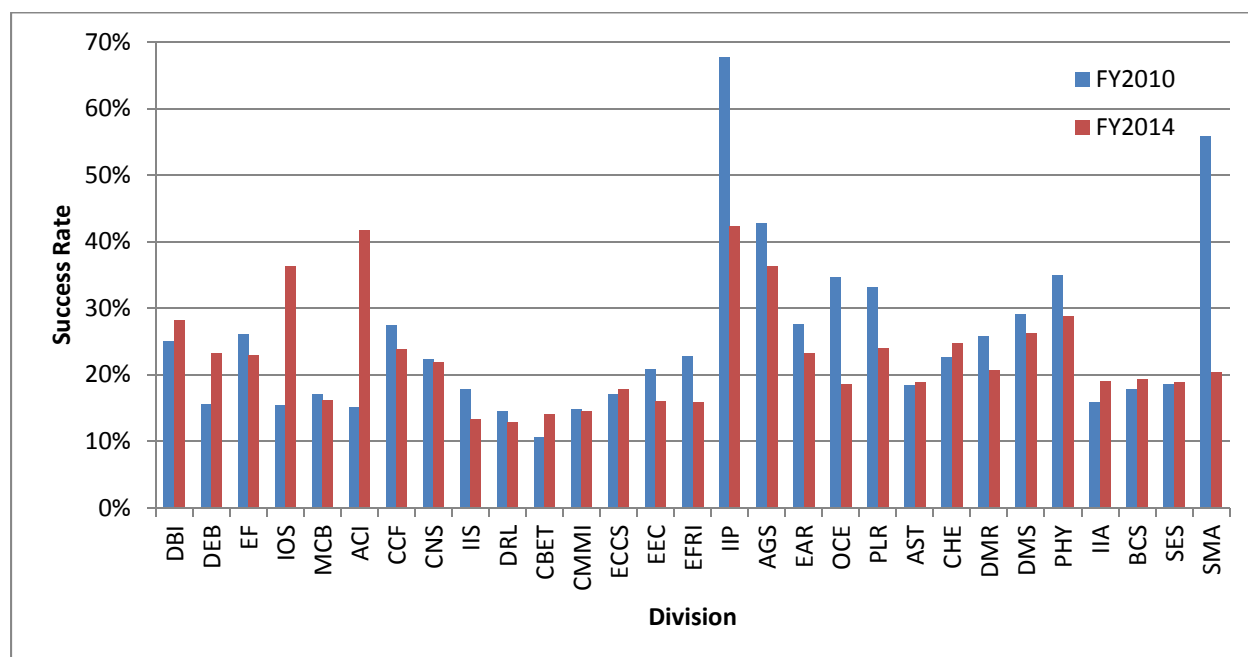
A comparison between research proposal submission rates in FY 2010 and FY 2014 is shown in **Figure 6.2** and a comparison between research proposal success rates in FY 2010 and FY 2014 is shown in **Figure 6.3**. Division acronyms are listed in **Appendix 22**.

Figure 6.2 – FY 2010 and FY 2014 Research Proposal Submission Rates, by Division



Source: NSF Enterprise Information System, 10/10/14.

Figure 6.3 – FY 2010 and FY 2014 Research Proposal Success Rates, by Division



Source: NSF Enterprise Information System, 10/10/14.

**Appendix 7 - Median and Mean Award Amounts for Research Grants,
by Directorate or Office (Dollars in Thousands)***

		Fiscal Year										
		2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014
NSF	Median	\$102	\$104	\$102	\$110	\$110	\$120	\$124	\$120	\$125	\$130	\$133
	Mean	\$140	\$144	\$135	\$146	\$143	\$162	\$167	\$159	\$166	\$169	\$172
BIO	Median	\$133	\$140	\$140	\$142	\$150	\$161	\$171	\$178	\$177	\$182	\$178
	Mean	\$171	\$184	\$191	\$182	\$180	\$200	\$222	\$226	\$214	\$228	\$217
CSE	Median	\$95	\$88	\$90	\$92	\$94	\$110	\$118	\$141	\$150	\$161	\$166
	Mean	\$135	\$120	\$114	\$120	\$131	\$169	\$172	\$174	\$206	\$204	\$199
ENG	Median	\$97	\$97	\$90	\$100	\$100	\$100	\$100	\$100	\$107	\$103	\$112
	Mean	\$120	\$117	\$110	\$116	\$112	\$120	\$122	\$119	\$125	\$122	\$131
GEO	Median	\$88	\$90	\$87	\$93	\$89	\$101	\$100	\$116	\$125	\$141	\$141
	Mean	\$126	\$126	\$113	\$137	\$122	\$153	\$134	\$162	\$170	\$193	\$201
IIA	Median	\$7	\$14	\$24	\$37	\$25	\$20	\$50	\$45	\$47	\$58	\$65
	Mean	\$16	\$85	\$71	\$135	\$30	\$46	\$272	\$71	\$190	\$135	\$105
MPS	Median	\$100	\$100	\$100	\$106	\$105	\$113	\$115	\$111	\$117	\$116	\$120
	Mean	\$130	\$135	\$120	\$130	\$133	\$138	\$150	\$141	\$143	\$130	\$141
SBE	Median	\$78	\$84	\$85	\$94	\$100	\$101	\$100	\$98	\$98	\$101	\$109
	Mean	\$90	\$110	\$103	\$115	\$116	\$114	\$116	\$113	\$120	\$139	\$134

Source: NSF Enterprise Information System, 10/1/14.

* EHR is not included in this appendix since the number of awards included in the “research grant” category is small relative to the number of education awards managed by that directorate.

Appendix 8 - Number of People Involved in NSF-funded Activities⁵³

In FY2014, approximately 321,000 senior researchers, post-doctoral associates, teachers and students across all levels were directly involved in NSF research and education programs and activities.

	FY 2014 Actual Estimate
Senior Researchers	40,788
Other Professionals	17,151
Post-doctoral Associates	5,629
Graduate Students	39,806
Undergraduate Students	34,080
K-12 Students	143,395
K-12 Teachers	40,079
Total Number of People	320,928

Source: NSF FY 2016 Budget Request to Congress, p. Summary Tables - 5.

In addition, NSF programs indirectly impact many millions of people. These programs reach K-12 students, K-12 teachers, the general public, and researchers. Outreach activities include workshops, activities at museums, television, educational videos, journal articles, and the dissemination of improved curricula and teaching methods.

⁵³ These data are estimates based on the budget details of awards active in the year indicated, with modifications made, as appropriate, based on additional information provided by the managing directorates or offices. The numbers for senior researchers, other professionals, post-doctoral associates, and graduate students are more directly informed by data from award budgets than the other three categories.

Appendix 9 – Mean Levels of Support in Single- and Multi-PI Research Grants

Table 9.1 Mean Number of Months of Salary Support for Single- and Multi-PI Research Grants, by Directorate or Office

Directorate or Office	Type of Award	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014
NSF	Single PI Grants	1.5	1.4	1.5	1.4	1.3	1.2	1.1	1.0	0.9	0.8	0.8
	Multi-PI Grants	1.4	1.4	1.3	1.3	1.1	1.1	1.0	0.9	0.9	0.8	0.8
	NSF Average	1.5	1.4	1.4	1.3	1.3	1.2	1.1	1.0	0.9	0.8	0.8
BIO	Single PI Grants	1.8	1.9	1.6	2.0	1.8	1.3	1.2	1.3	1.1	1.0	1.0
	Multi-PI Grants	1.7	2.3	2.0	2.0	1.7	1.6	1.2	1.1	1.1	1.3	1.0
	BIO Average	1.7	2.0	1.7	2.0	1.8	1.4	1.2	1.2	1.1	1.1	1.0
CSE	Single PI Grants	1.0	1.0	1.1	0.9	0.7	0.8	0.8	0.9	0.7	0.7	0.7
	Multi-PI Grants	0.9	0.8	0.6	0.7	0.5	0.6	0.6	0.8	0.7	0.6	0.7
	CSE Average	1.0	0.9	0.9	0.8	0.6	0.7	0.7	0.9	0.7	0.6	0.7
EHR	Single PI Grants	3.0	2.0	1.5	1.6	2.0	1.6	1.9	1.7	1.4	1.4	1.0
	Multi-PI Grants	1.9	2.0	1.8	1.5	1.2	1.6	1.8	2.2	1.7	1.0	0.9
	EHR Average	2.2	2.0	1.7	1.5	1.5	1.6	1.8	2.1	1.6	1.1	0.9
ENG	Single PI Grants	1.1	1.0	1.2	1.2	0.9	0.9	0.4	0.4	0.6	0.4	0.3
	Multi-PI Grants	0.9	0.9	0.7	0.8	0.7	0.7	0.4	0.3	0.3	0.3	0.3
	ENG Average	1.0	1.0	1.0	1.0	0.8	0.8	0.4	0.4	0.5	0.4	0.3
GEO	Single PI Grants	1.6	1.4	1.4	1.3	1.1	1.0	1.1	1.0	1.0	0.9	1.0
	Multi-PI Grants	1.5	1.6	1.5	1.3	1.2	1.1	1.1	1.0	1.3	1.3	1.2
	GEO Average	1.6	1.4	1.4	1.3	1.1	1.1	1.1	1.0	1.1	1.0	1.1
IIA	Single PI Grants	0.8	2.4	1.9	2.5	3.3	0.6	1.5	1.8	0.4	1.0	0.7
	Multi-PI Grants	3.1	1.0	1.5	1.0	1.0	1.0	1.1	0.5	0.7	0.9	0.5
	IIA Average	1.6	1.2	1.8	1.2	2.2	0.9	1.2	1.0	0.6	1.0	0.6
MPS	Single PI Grants	1.4	1.4	1.4	1.3	1.3	1.5	1.3	1.3	1.1	1.0	1.0
	Multi-PI Grants	2.0	1.4	1.5	1.5	1.4	1.5	1.2	1.2	0.9	0.9	0.9
	MPS Average	1.6	1.4	1.4	1.3	1.4	1.5	1.3	1.3	1.0	1.0	1.0
SBE	Single PI Grants	1.7	1.7	1.9	1.6	2.0	1.5	1.7	1.2	1.2	1.1	1.1
	Multi-PI Grants	1.1	1.3	1.4	1.4	1.1	1.0	1.3	0.9	0.9	1.2	1.2
	SBE Average	1.5	1.6	1.7	1.5	1.7	1.4	1.6	1.1	1.1	1.1	1.2

Source: NSF Enterprise Information System, 11/27/13.

Table 9.2 Mean Annualized Graduate Student Support on Research Grants

	Mean Annualized Level of Graduate Student Support per Research Grant	
Fiscal Year	All Research Grants	Research Grants with Graduate Student Support
2001	\$13,592	\$19,971
2002	\$13,085	\$19,379
2003	\$14,814	\$21,062
2004	\$14,551	\$21,155
2005	\$14,306	\$20,464
2006	\$14,220	\$20,182
2007	\$14,811	\$20,411
2008	\$15,415	\$21,100
2009	\$16,907	\$22,684
2010	\$15,780	\$22,086
2011	\$17,182	\$24,259
2012	\$19,884	\$28,101
2013	\$20,937	\$29,101
2014	\$21,028	\$29,381

Table 9.3 Mean Annualized Post-Doctoral Researcher Support on Research Grants

	Mean Annualized Level of Post-Doctoral Researcher Support per Research Grant	
	All Research Grants	Research Grants with Post-Doc. Support
2001	\$5,375	\$24,840
2002	\$5,283	\$26,279
2003	\$5,111	\$23,577
2004	\$4,810	\$23,940
2005	\$4,840	\$24,909
2006	\$4,214	\$23,987
2007	\$4,491	\$25,814
2008	\$4,214	\$24,998
2009	\$4,718	\$26,747
2010	\$5,183	\$28,587
2011	\$5,377	\$29,639
2012	\$5,992	\$35,593
2013	\$6,060	\$34,674
2014	\$5,492	\$34,142

**Appendix 10 - Mean Number of Research Proposals per PI before Receiving One Award,
by Directorate or Office, by Fiscal Year Triads.**

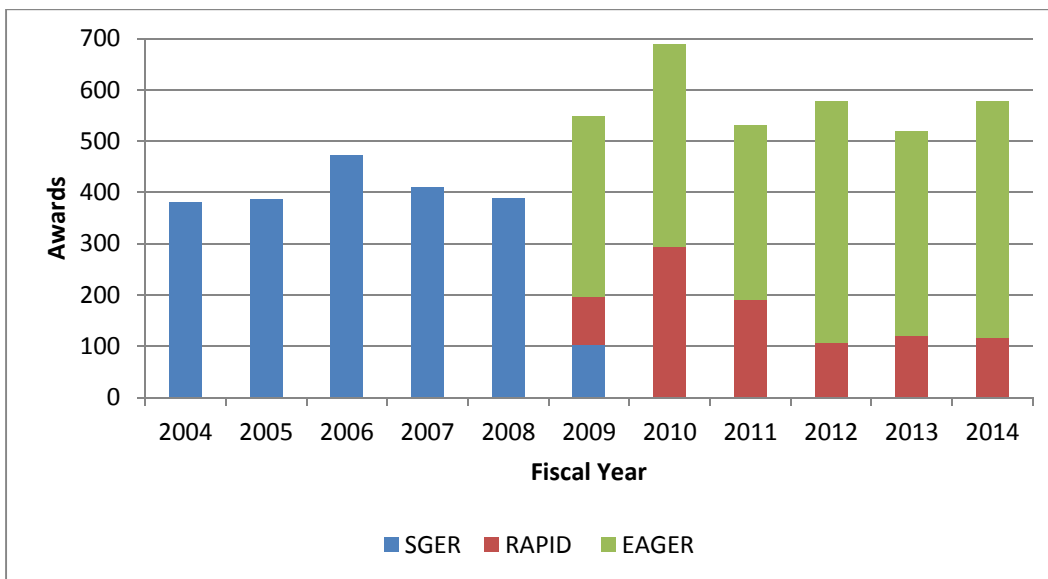
	2002- 2004	2003- 2005	2004- 2006	2005- 2007	2006- 2008	2007- 2009	2008- 2010	2009- 2011	2010- 2012	2011- 2013	2012- 2014
NSF	2.1	2.2	2.2	2.2	2.2	2.2	2.3	2.3	2.4	2.4	2.4
BIO	1.8	2.0	2.0	2.2	2.2	2.1	2.1	2.1	2.1	1.9	1.7
CISE	2.5	2.6	2.6	2.4	2.4	2.4	2.6	2.5	2.6	2.6	2.7
EHR	1.2	1.3	1.3	1.4	1.3	1.4	1.4	1.4	1.5	1.7	1.7
ENG	2.2	2.3	2.4	2.6	2.5	2.5	2.6	2.7	2.8	2.6	2.6
GEO	2.1	2.2	2.2	2.3	2.2	2.1	2.0	2.0	2.1	2.2	2.2
MPS	1.5	1.6	1.6	1.6	1.6	1.6	1.6	1.6	1.6	1.6	1.6
O/D	1.1	1.1	1.1	1.2	1.2	1.2	1.2	1.2	1.1	1.1	1.1
SBE	1.6	1.7	1.7	1.6	1.6	1.6	1.6	1.6	1.7	1.6	1.6

Source: NSF Enterprise Information System, 10/10/14.

Appendix 11 - Small Grants for Exploratory Research (SGER), EARly-concept Grants for Exploratory Research (EAGER), and Grants for Rapid Response Research (RAPID)

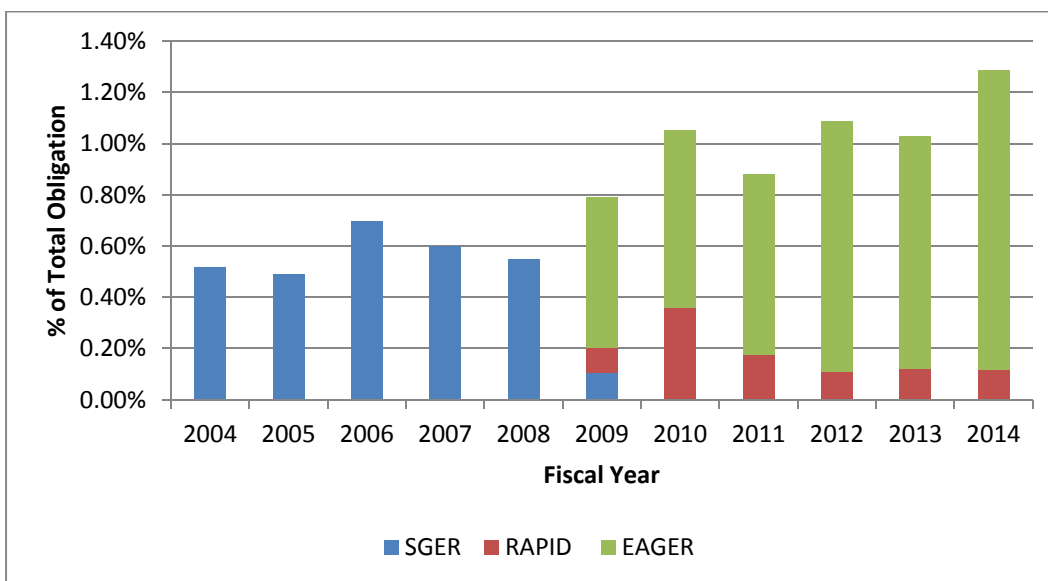
Figures 11.1, 11.2 and Table 11.1 provide funding trends for EAGERS, RAPIDs, and SGERs. Effective January 2009, the SGER funding mechanism was replaced by two separate funding mechanisms EAGER and RAPID so FY 2009 included all three types of awards.

Figure 11.1 – Numbers of SGER, EAGER and RAPID Awards



Source: NSF Enterprise Information System 10/10/14.

Figure 11.2 – Investments in SGER, EAGER and RAPID Awards



Source: NSF Enterprise Information System 10/10/14 and 01/29/15.

Table 11.1 - EARly-concept Grants for Exploratory Research (EAGER) and Grants for Rapid Response Research (RAPID): Funding Trends, by Directorate or Office

		2010		2011		2012		2013		2014	
		RAPID	EAGER	RAPID	EAGER	RAPID	EAGER	RAPID	EAGER	RAPID	EAGER
NSF	Proposals	341	440	237	360	114	519	123	441	127	537
	Awards	294	395	190	341	107	472	121	399	117	462
	Funding Rate	86%	90%	80%	95%	94%	91%	98%	90%	92%	86%
	Total \$ (Millions)	\$27.4	\$53.2	\$12.3	\$49.3	\$7.9	\$70.3	\$8.4	\$64.2	\$8.6	\$85.0
	% of Obligations	0.4%	0.7%	0.2%	0.7%	0.1%	1.0%	0.1%	0.9%	0.1%	1.2%
	Average \$ (Thousands)	\$93	\$135	\$65	\$145	\$74	\$149	\$70	\$161	\$73	\$184
BIO	Proposals	52	45	10	34	14	54	13	32	17	80
	Awards	41	41	8	27	13	50	12	25	13	77
	Funding Rate	79%	91%	80%	79%	93%	93%	92%	78%	76%	96%
	Total \$ (Millions)	\$5.1	\$8.3	\$0.9	\$5.8	\$1.2	\$9.0	\$1.5	\$6.1	\$1.4	\$19.1
	% of Obligations	0.7%	1.1%	0.1%	0.8%	0.1%	1.2%	0.2%	0.8%	0.2%	2.3%
	Average \$ (Thousands)	\$124	\$202	\$107	\$214	\$89	\$181	\$124	\$243	\$111	\$247
CSE	Proposals	13	197	28	148	11	173	2	171	3	193
	Awards	12	172	24	145	10	166	2	165	3	159
	Funding Rate	92%	87%	86%	98%	91%	96%	100%	96%	100%	82%
	Total \$ (Millions)	\$1.4	\$23.1	\$1.5	\$22.6	\$1.2	\$28.1	\$0.1	\$27.6	\$0.4	\$28.9
	% of Obligations	0.2%	2.7%	0.2%	2.4%	0.1%	3.0%	0.0%	3.0%	0.0%	3.2%
	Average \$ (Thousands)	\$115	\$134	\$61	\$156	\$116	\$169	\$45	\$168	\$144	\$182
EHR	Proposals	13	2	9	4	5	48	5	33	3	50
	Awards	12	0	8	4	5	25	5	19	3	37
	Funding Rate	92%	0%	89%	100%	100%	52%	100%	58%	100%	74%
	Total \$ (Millions)	\$1.9	\$0.2	\$1.5	\$1.2	\$0.7	\$6.3	\$0.8	\$4.9	\$0.7	\$9.4
	% of Obligations	0.2%	0.0%	0.2%	0.1%	0.1%	0.6%	0.1%	0.5%	0.1%	1.0%
	Average \$ (Thousands)	\$162	N/A	\$184	\$303	\$146	\$252	\$153	\$258	\$231	\$253
ENG	Proposals	95	96	62	92	12	109	38	134	35	108
	Awards	66	92	35	88	10	107	38	125	34	96
	Funding Rate	69%	96%	56%	96%	83%	98%	100%	93%	97%	89%
	Total \$ (Millions)	\$5.0	\$9.1	\$1.9	\$8.9	\$0.4	\$12.7	\$1.8	\$16.4	\$1.6	\$14.6
	% of Obligations	0.6%	1.1%	0.2%	1.1%	0.1%	1.5%	0.2%	2.0%	0.2%	1.7%
	Average \$ (Thousands)	\$76	\$99	\$53	\$101	\$42	\$119	\$49	\$131	\$47	\$152
GEO	Proposals	119	49	99	60	63	93	47	51	51	47
	Awards	118	48	93	57	61	89	47	49	51	46
	Funding Rate	99%	98%	94%	95%	97%	96%	100%	96%	100%	98%
	Total \$ (Millions)	\$10.3	\$4.8	\$5.2	\$6.8	\$3.8	\$8.2	\$3.1	\$5.0	\$3.0	\$5.1
	% of Obligations	0.7%	0.3%	0.4%	0.5%	0.3%	0.6%	0.2%	0.4%	0.2%	0.4%
	Average \$ (Thousands)	\$87	\$99	\$56	\$120	\$62	\$92	\$66	\$103	\$60	\$112
MPS	Proposals	19	41	2	14	2	29	2	9	1	20
	Awards	16	34	2	12	1	24	2	6	1	19
	Funding Rate	84%	83%	100%	86%	50%	83%	100%	67%	100%	95%
	Total \$ (Millions)	\$1.6	\$6.7	\$0.2	\$2.2	\$0.0	\$4.3	\$0.3	\$2.3	\$0.2	\$3.5
	% of Obligations	0.1%	0.4%	0.0%	0.2%	0.0%	0.3%	0.0%	0.2%	0.0%	0.3%
	Average \$ (Thousands)	\$98	\$197	\$125	\$183	\$23	\$181	\$163	\$386	\$209	\$183

		2010		2011		2012		2013		2014	
		RAPID	EAGER	RAPID	EAGER	RAPID	EAGER	RAPID	EAGER	RAPID	EAGER
SBE	Proposals	30	5	26	6	7	11	16	11	17	39
	Awards	29	4	19	6	7	9	15	10	12	28
	Funding Rate	97%	80%	73%	100%	100%	82%	94%	91%	71%	72%
	Total \$ (Millions)	\$1.6	\$0.6	\$0.9	\$1.0	\$0.6	\$1.2	\$0.6	\$1.3	\$1.0	\$4.2
	% of Obligations	0.6%	0.2%	0.4%	0.4%	0.2%	0.5%	0.2%	0.5%	0.4%	1.6%
	Average \$ (Thousands)	\$56	\$139	\$50	\$172	\$80	\$130	\$40	\$132	\$81	\$151
IIA	Proposals	0	5	1	2	0	2	0	0	0	0
	Awards	0	4	1	2	0	2	0	0	0	0
	Funding Rate	N/A	80%	100%	100%	N/A	100%	N/A	N/A	N/A	N/A
	Total \$ (Millions)	\$0.7	\$0.6	\$0.3	\$0.8	\$0.1	\$0.4	\$0.2	\$0.5	\$0.2	\$0.2
	% of Obligations	0.2%	0.1%	0.1%	0.4%	0.0%	0.2%	0.1%	0.1%	0.0%	0.1%
	Average \$ (Thousands)	N/A	\$150	\$261	\$376	N/A	\$196	N/A	N/A	N/A	N/A

Source: NSF Enterprise Information System, 10/10/14 and 01/29/15. No distinction is made between funds obligated by a directorate to awards managed by that directorate and funds obligated by a directorate as co-funding for awards managed by other directorates. IIA totals include co-funding by its EPSCoR and International Science and Engineering sections.

Appendix 12 – Description of Merit Review Principles and Criteria.⁵⁴

1. Merit Review Principles

These principles are to be given due diligence by PIs and organizations when preparing proposals and managing projects, by reviewers when reading and evaluating proposals, and by NSF program staff when determining whether or not to recommend proposals for funding and while overseeing awards. Given that NSF is the primary federal agency charged with nurturing and supporting excellence in basic research and education, the following three principles apply:

- All NSF projects should be of the highest quality and have the potential to advance, if not transform, the frontiers of knowledge.
- NSF projects, in the aggregate, should contribute more broadly to achieving societal goals. These broader impacts may be accomplished through the research itself, through activities that are directly related to specific research projects, or through activities that are supported by, but are complementary to, the project. The project activities may be based on previously established and/or innovative methods and approaches, but in either case must be well justified.
- Meaningful assessment and evaluation of NSF funded projects should be based on appropriate metrics, keeping in mind the likely correlation between the effect of broader impacts and the resources provided to implement projects. If the size of the activity is limited, evaluation of that activity in isolation is not likely to be meaningful. Thus, assessing the effectiveness of these activities may best be done at a higher, more aggregated, level than the individual project.

With respect to the third principle, even if assessment of Broader Impacts outcomes for particular projects is done at an aggregated level, PIs are expected to be accountable for carrying out the activities described in the activities that the PI intends to do, and [to have] a plan in place to document the outputs of those activities.

These three merit review principles provide the basis for the merit review criteria, as well as a context within which the users of the criteria can better understand their intent.

2. Merit Review Criteria

All NSF proposals are evaluated through [the] use of two National Science Board approved merit review criteria. In some instances, however, NSF will employ additional criteria as required to highlight the specific objectives of certain programs and activities.

The two merit review criteria are listed below. Both criteria are to be given full consideration during the review and decision-making processes; each criterion is necessary but neither, by itself, is sufficient. Therefore, proposers must fully address both criteria. (GPG Chapter II.C.2.d.(i) contains additional information for use by proposers in development of the Project Description section of the proposal.) Reviewers are strongly encouraged to review the criteria, including GPG Chapter II.C.2.d.(i), prior to the review of a proposal.

⁵⁴ From NSF *Grant Proposal Guide*, http://www.nsf.gov/pubs/policydocs/pappguide/nsf13001/gpg_index.jsp (GPG). Effective from January 14th, 2013.

When evaluating NSF proposals, reviewers will be asked to consider what the proposers want to do, why they want to do it, how they plan to do it, how they will know if they succeed, and what benefits could accrue if the project is successful. These issues apply both to the technical aspects of the proposal and the way in which the project may make broader contributions. To that end, reviewers will be asked to evaluate all proposals against two criteria:

- **Intellectual Merit:** The Intellectual Merit criterion encompasses the potential to advance knowledge;
- and
- **Broader Impacts:** The Broader Impacts criterion encompasses the potential to benefit society and contribute to the achievement of specific, desired societal outcomes.

The following elements should be considered in the review for both criteria:

1. What is the potential for the proposed activity to:
 - a. Advance knowledge and understanding within its own field or across different fields (Intellectual Merit); and
 - b. Benefit society or advance desired societal outcomes (Broader Impacts)?
2. To what extent do the proposed activities suggest and explore creative, original, or potentially transformative concepts?
3. Is the plan for carrying out the proposed activities well-reasoned, well-organized, and based on a sound rationale? Does the plan incorporate a mechanism to assess success?
4. How well qualified is the individual, team, or organization to conduct the proposed activities?
5. Are there adequate resources available to the PI (either at the home organization or through collaborations) to carry out the proposed activities?

Appendix 13 –Proposals Returned Without Review, by Reason

Full Proposals	
Reason	Number returned
Inappropriate for NSF	74
Insufficient lead time	8
Preliminary proposal did not result in an invitation to submit a full proposal	2
Duplicates a proposal in review	66
Format problem	130
Did not address both merit review criteria in Project Summary	187
Not responsive to solicitation, program announcement, or Grant Proposal Guide	960
Received past the deadline	171
Not substantially revised after a previous declination	37
Duplicates an existing award	24
TOTAL	1659

Preliminary Proposals	
Reason	Number returned
Inappropriate for NSF	2
Insufficient lead time	1
Duplicates a proposal in review	2
Format problem	13
Did not address both merit review criteria in Project Summary	3
Not responsive to solicitation, program announcement, or Grant Proposal Guide	32
Received past the deadline	7
TOTAL	60

Source: NSF Enterprise Information System, 3/18/15.

Appendix 14 - Oversight and Advisory Mechanisms

- **Committees of Visitors.**

To ensure the highest quality in processing and recommending proposals for awards, NSF convenes external groups of experts, called Committees of Visitors (COVs), to review each major program approximately every three to five years. This includes disciplinary programs in the various directorates and offices, and the cross-disciplinary programs managed across directorates. The COVs (comprised of scientists, engineers and educators from academia, industry, and government) convene at NSF for a one to three-day assessment. These experts evaluate the integrity and efficiency of the processes used for proposal review and program decision-making. In addition, the COVs examine program management and portfolio balance. The COV reports, written as answers and commentary to specific questions, are reviewed by Advisory Committees and then submitted to the directorates and the NSF Director. Questions include aspects of the program portfolio, such as the balance of high-risk, multidisciplinary, and innovative projects. The recommendations of COVs are reviewed by management and taken into consideration by NSF when evaluating existing programs and future directions for the Foundation.⁵⁵

- **Advisory Committee Reporting on Directorate/Office Performance.**

Advisory Committees regularly provide community perspectives to the research and education directorates as well as on cross-cutting NSF topics such as cyberinfrastructure, international science and engineering, environmental research and education, business and operations, and equal opportunities in science and engineering. They are typically composed of 15-25 experts who have experience relevant to the programs or topics and are broadly drawn from academia, industry, and government. Advisory Committees, as part of their mission, review COV reports and staff responses.

⁵⁵ The COV reports and directorate responses are available electronically at <http://www.nsf.gov/od/iaa/activities/cov/covs.jsp>.

Appendix 15 - Requests for Formal Reconsideration of Declined Proposals

		Fiscal Year										
		2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014
First Level Reviews (Assistant Directors):												
BIO	Request	3	2	4	2	5	3	1	4	2	2	0
	- Upheld	3	2	4	2	5	3	1	3	0	2	0
	- Reversed	0	0	0	0	0	0	0	1	2	0	0
CISE	Request	2	3	1	1	0	0	2	3	5	1	4
	- Upheld	2	3	1	1	0	0	2	3	5	1	3
	- Reversed	0	0	0	0	0	0	0	0	0	0	0
EHR	Request	2	7	4	6	7	2	2	2	3	4	2
	- Upheld	2	7	4	6	7	2	2	2	3	4	2
	- Reversed	0	0	0	0	0	0	0	0	0	0	0
ENG	Request	3	3	6	3	3	3	11	8	5	7**	11
	- Upheld	3	3	6	3	3	3	9	7	5	5	11
	- Reversed	0	0	0	0	0	0	2	1	0	1	0
GEO	Request	4	0	0	2	0	2	3	2	2	1	1
	- Upheld	4	0	0	2	0	1	3	2	2	1	1
	- Reversed	0	0	0	0	0	1	0	0	0	0	0
MPS	Request	24	15	16	16	14	9	14 [^]	11	22	12	12
	- Upheld	24	15	15	15	14	7	12	11	21	11	12
	- Reversed	0	0	1	1	0	2	0	0	1	1	0
SBE	Request	3	3	4	0	2	1	1	0	0	0	0
	- Upheld	3	3	4	0	2	1	1	0	0	0	0
	- Reversed	0	0	0	0	0	0	0	0	0	0	0
Other*	Request	0	0	0	3	0	1	0	0	1	0	0
	- Upheld	0	0	0	3	0	0	0	0	1	0	0
	- Reversed	0	0	0	0	0	1	0	0	0	0	0
Second Level Reviews (Deputy Director):												
O/DD	Request	7	2	0	1	3	2	3	3	6	1	3
	- Upheld	7	2	0	1	3	2	3	1	6	1	3
	- Reversed	0	0	0	0	0	0	0	2	0	0	0
Total Reviews First & Second Level												
NSF	Request	48	35	35	34	34	23	37 [^]	33	46	28	33
	- Upheld	48	35	34	33	34	19	33	29	43	25	32
	- Reversed	0	0	1	1	0	4	2	4	3	2	0

Source: Office of the Director, 12/19/14.

* From 2005 to 2012, the “Other” category includes OCI, OIA, OPP, and OISE. For FY 2013 and FY 2014, it includes IIA.

[^] The number of decisions (upheld or reversed) may not equal the number of requests in each year due to carryover of a pending reconsideration request.

** One reconsideration request was returned to the PI for failure to follow the procedure described in the Grant Proposal Guide.

**Appendix 16 - Mean Number of Reviews per Proposal, by Method
and Directorate or Office, FY 2014**

		Methods of Review						
		All Methods	Mail + Panel	Mail-Only	Panel-Only	Not Reviewed *	Returned without Review	Withdrawn Proposals
NSF	Reviews	181,460	59,090	12,285	110,085			
	Proposals	46,269	12,452	3,001	30,816	1,782	1659	282
	Rev/Prop	3.9	4.7	4.1	3.6			
BIO	Reviews	19,486	10,949	691	7,846			
	Proposals	4,616	2,179	151	2,286	168	262	24
	Rev/Prop	4.2	5.0	4.5	3.4			
CSE	Reviews	29,281	4,368	311	24,602			
	Proposals	7,032	864	83	6,085	399	102	51
	Rev/Prop	4.2	5.1	3.7	4.0			
EHR	Reviews	17,015	1,504	356	15,155			
	Proposals	3,966	296	94	3,576	82	59	5
	Rev/Prop	4.3	5.1	3.8	4.2			
ENG	Reviews	41,021	2,036	1,471	37,514			
	Proposals	11,560	480	281	10,799	320	811	32
	Rev/Prop	3.5	4.2	5.2	3.5			
GEO	Reviews	24,627	19,717	3,119	1,791			
	Proposals	5,591	4,235	781	575	195	68	43
	Rev/Prop	4.4	4.7	4.0	3.1			
IIA	Reviews	2,089	230	176	1,683			
	Proposals	752	45	52	655	3	81	6
	Rev/Prop	2.8	5.1	3.4	2.6			
MPS	Reviews	29,133	7,915	5,080	16,138			
	Proposals	8,319	1,859	1,273	5,187	532	175	85
	Rev/Prop	3.5	4.3	4.0	3.1			
SBE	Reviews	18,808	12,371	1,081	5,356			
	Proposals	4,433	2,494	286	1,653	83	101	36
	Rev/Prop	4.2	5.0	3.8	3.2			

Source: NSF Enterprise Information System, 10/01/14.

* The proposals totals shown in the “All Methods” category do not include the proposals shown in the “Not Reviewed” category. Proposals which are not reviewed include RAPIDs, EAGERS, INSPIRE Track 1s, and small grants for travel and symposia.

The “Not Reviewed” category includes award and decline actions for proposals that were not reviewed, while the “Returned without Review” and “Withdrawn Proposals” categories reflect proposals which were neither awarded nor declined.

The counts of panel reviews do not include panel summaries. There were 44,393 panel summaries in FY 2014.

Withdrawn proposals include only those that underwent merit review.

The reviews of an individual participating as both a mail and a panel reviewer for the same proposal are counted as one review in this table.

Appendix 17 - Methods of NSF Proposal Review

FY	Total	Mail + Panel		Mail Only		Panel Only		Not Externally Reviewed	
	Proposals	Proposals	Percent	Proposals	Percent	Proposals	Percent	Proposals	Percent
2014	48,051	12,452	26%	3,001	6%	30,816	64%	1,782	4%
2013	48,999	13,394	27%	2,814	6%	30,710	63%	2,081	4%
2012	48,613	12,851	26%	2,639	5%	30,700	63%	2,423	5%
2011	51,562	14,594	28%	3,352	7%	31,878	62%	1,738	3%
2010	55,542	16,483	30%	3,853	7%	32,859	59%	2,347	4%
2009	45,181	14,262	32%	3,370	7%	25,835	57%	1,714	4%
2008	44,428	14,355	32%	3,662	8%	24,966	56%	1,445	3%
2007	44,577	14,292	32%	3,737	8%	25,135	56%	1,413	3%
2006	42,352	14,349	34%	3,895	9%	22,384	53%	1,724	4%
2005	41,722	13,919	33%	3,656	9%	22,735	54%	1,412	3%
2004	43,851	13,345	30%	4,496	10%	24,553	56%	1,457	3%
2003	40,075	12,683	32%	4,579	11%	21,391	53%	1,388	3%
2002	35,164	11,346	32%	4,838	14%	17,616	50%	1,364	4%

Source: NSF Enterprise Information System, 10/01/14.

Appendix 18 - Methods of NSF Proposal Review, by Directorate or Office – FY 2014

Directorate	Total Proposals	Mail + Panel		Mail-Only		Panel-Only		Not Reviewed	
		Proposals	Percent	Proposals	Percent	Proposals	Percent	Proposals	Percent
NSF	48,051	12,452	26%	3,001	6%	30,816	64%	1,782	4%
BIO	4,784	2,179	46%	151	3%	2,286	48%	168	4%
CSE	7,431	864	12%	83	1%	6,085	82%	399	5%
EHR	4,048	296	7%	94	2%	3,576	88%	82	2%
ENG	11,880	480	4%	281	2%	10,799	91%	320	3%
GEO	5,786	4,235	73%	781	13%	575	10%	195	3%
IIA	755	45	6%	52	7%	655	87%	3	0%
MPS	8,851	1,859	21%	1,273	14%	5,187	59%	532	6%
SBE	4,516	2,494	55%	286	6%	1,653	37%	83	2%

Source: NSF Enterprise Information System, 10/01/14.

Appendix 19 - Mean Reviewer Ratings, by Method of Review - FY 2014

Source: NSF Enterprise Information System, 10/01/14.

Appendix 20 - Accomplishment-Based Renewals and Creativity Extensions

Accomplishment-Based Renewals

In an accomplishment-based renewal, the project description is replaced by copies of no more than six reprints of publications resulting from the research supported by NSF (or research supported by other sources that is closely related to the NSF-supported research) during the preceding three-to-five year period. In addition, a brief (not to exceed four pages) summary of plans for the proposed support period must be submitted, together with information on human resources development at the post-doctoral, graduate and undergraduate levels. All other information required for NSF proposal submission remains the same. The proposals undergo merit review in the tradition of the specific program. In FY 2014, there were 49 requests for accomplishment-based renewals, 14 of which were awarded. **Table 20.1** shows the number of accomplishment-based renewals by directorate or office.

Creativity Extensions

A program officer may recommend the extension of funding for certain research grants beyond the initial period for which the grant was awarded, for a period of up to two years. The objective is to offer the most creative investigators an extension to address opportunities in the same general research area, but not necessarily within the scope covered by the original/current proposal. Awards eligible for such an extension are generally three-year continuing grants. Special Creativity Extensions are usually initiated by the NSF program officer based on progress during the first two years of a three-year grant. In FY 2014, 26 Special Creativity Extensions were awarded.

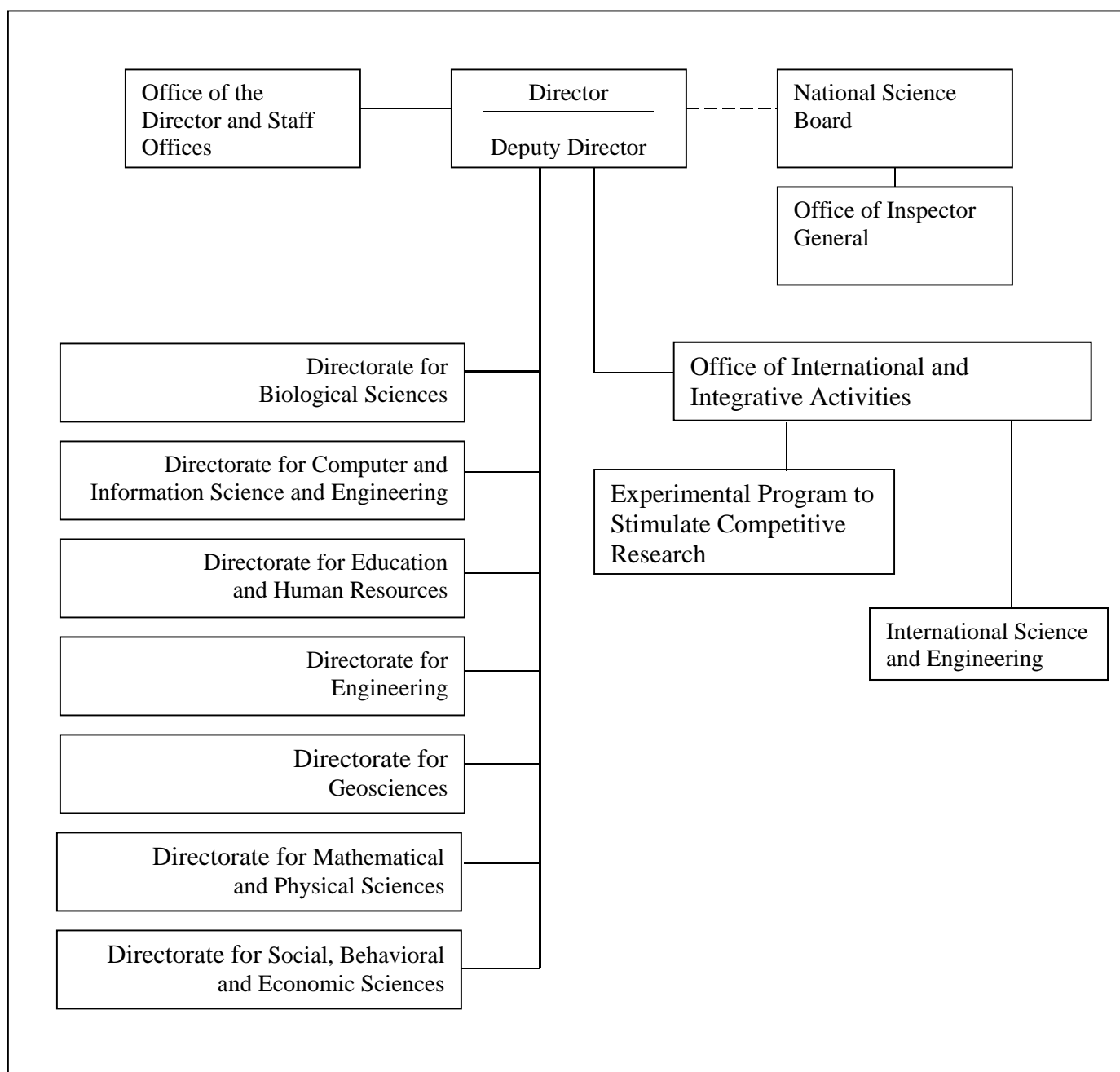
Table 20.1 - Accomplishment-Based Renewals, by Directorate or Office

Directorate or Office	Award vs. Decline	2006	2007	2008	2009	2010	2011	2012	2013	2014
NSF	Award	32	27	28	40	34	19	30	19	14
	Decline	70	70	51	54	52	43	41	52	35
	Mean Annual Award	\$106,188	\$146,658	\$164,211	\$225,438	\$150,171	\$253,026	\$255,959	\$414,467	\$174,227
BIO	Award	5	4	3	5	8	3	2	4	3
	Decline	20	25	13	16	11	6	3	6	5
	Mean Annual Award	\$109,684	\$82,697	\$62,444	\$123,533	\$151,999	\$344,742	\$78,815	\$835,142	\$298,359
CISE	Award	1	1	1	2	1	0	0	2	0
	Decline	2	3	1	0	2	2	2	1	0
	Mean Annual Award	\$62,500	\$37,500	\$60,010	\$267,851	\$272,833	N/A	N/A	\$819,996	N/A
EHR	Award	2	2	2	3	3	1	2	0	1
	Decline	14	6	3	7	6	5	4	4	4
	Mean Annual Award	\$154,495	\$117,877	\$390,611	\$361,873	\$304,579	\$33,352	\$530,633	N/A	\$354,796
ENG	Award	3	2	1	1	1	2	4	3	3
	Decline	14	13	6	13	7	5	7	10	2
	Mean Annual Award	\$49,997	\$83,542	\$54,117	\$124,977	\$152,483	\$121,725	\$194,881	\$207,017	\$45,309
GEO	Award	8	8	8	10	8	4	12	5	1
	Decline	3	4	3	3	8	4	3	6	9
	Mean Annual Award	\$134,802	\$74,091	\$113,891	\$343,864	\$144,094	\$143,699	\$234,306	\$222,092	\$118,252
MPS	Award	7	10	12	16	11	8	10	5	6
	Decline	13	16	19	12	13	15	18	21	14
	Mean Annual Award	\$126,032	\$253,195	\$219,868	\$188,219	\$115,657	\$354,936	\$297,020	\$155,611	\$155,854
SBE	Award	6	0	1	3	1	1	0	0	0
	Decline	4	3	6	3	3	5	4	4	1
	Mean Annual Award	\$52,954	N/A	\$76,993	\$67,808	\$75,789	\$82,187	N/A	N/A	N/A
IIA	Award					1	0			
	Decline					2	1			
	Mean Annual Award					\$50,000	N/A			

Source: NSF Enterprise Information System, 10/01/14. "N/A" = No accomplishment-based renewals awarded.

Mean annual award size is based on the annualized award size of each award. The latter is the total awarded, including supplements, divided by the award duration, including extensions. Since supplements and extensions occur post-award, the mean annual award amount for each directorate in prior years may change with time.

Appendix 21 - National Science Foundation Organization Chart*



*In September 2012, the Director announced a realignment of program offices that reported directly to the Office of the Director. The figure shows the organizational structure in place during FY 2014.

Appendix 22 - Acronyms

<u>Acronym</u>	<u>Definition</u>
ACI	Division of Advanced Cyberinfrastructure
AGS	Division of Atmospheric and Geospace Sciences
ARRA	American Recovery and Reinvestment Act
AST	Division of Astronomical Sciences
BCS	Division of Behavioral and Cognitive Sciences
BFA	Office of Budget, Finance and Award Management
BIO	Directorate for Biological Sciences
CBET	Division of Chemical, Bioengineering, Environmental and Transport Systems
CCF	Division of Computing and Communication Foundations
CFR	Code of Federal Regulations
CGI	Continuing Grant Increment
CHE	Division of Chemistry
CISE	Directorate for Computer and Information Science and Engineering
CMMI	Division of Civil, Mechanical and Manufacturing Innovation
CNS	Division of Computer and Network Systems
COV	Committee of Visitors
CSE	Directorate for Computer and Information Science and Engineering
DBI	Division of Biological Infrastructure
DD	Division Director
DEB	Division of Environmental Biology
DGE	Division of Graduate Education
DMR	Division of Materials Research
DMS	Division of Mathematical Sciences
DRL	Division of Research on Learning in Formal and Informal Settings
DUE	Division of Undergraduate Education
EAGER	EARly-concept Grants for Exploratory Research
EAR	Division of Earth Sciences
ECCS	Division of Electrical, Communications and Cyber Systems
EEC	Division of Engineering Education and Centers
EF	Emerging Frontiers
EFRI	Emerging Frontiers in Research and Innovation
EHR	Directorate for Education and Human Resources
ENG	Directorate for Engineering
EPSCoR	Experimental Program to Stimulate Competitive Research
FY	Fiscal Year (October 1 – September 30)
GDP	Gross Domestic Product
GEO	Directorate for Geosciences
GPG	Grant Proposal Guide
GSS	Geography and Spatial Sciences program

HRD	Division of Human Resource Development
IF	Infrastructure and Facilities program
IIA	Office of International and Integrative Activities
IIP	Industrial Innovation and Partnerships
IIS	Division of Information and Intelligent Systems
IOS	Division of Integrative Organismal Systems
INSPIRE	Integrated NSF Support Promoting Interdisciplinary Research and Education
IPAs	Temporary employees hired through the Intergovernmental Personnel Act
IPS	Interactive Panel System
ISE	International Science & Engineering
K-12	Kindergarten to 12 th grade
MCB	Division of Molecular and Cellular Biosciences
MPI	Multiple PI
MPS	Directorate for Mathematical and Physical Sciences
MSI	Minority-Serving Institution
NSB	National Science Board
NSF	National Science Foundation
OCE	Division of Ocean Sciences
OCI	Office of Cyberinfrastructure
OD	Office of the Director
ODD	Office of the Deputy Director
OIA	Office of Integrative Activities
OISE	Office of International Science & Engineering
OPP	Office of Polar Programs
PARS	Proposal, PI and Reviewer System
PI	Principal Investigator
PLR	Division of Polar Programs
PHY	Division of Physics
PWD	PI (or Person) With a Disability
RAPID	Grants for Rapid Response Research
RWR	Return Without Review
SBE	Directorate for Social, Behavioral and Economic Sciences
SCI	Division of Shared Cyberinfrastructure
SES	Division of Social and Economic Sciences
SGER	Small Grants for Exploratory Research
SMA	Office of Multidisciplinary Activities in the Directorate for Social, Behavioral and Economic Sciences
SPI	Single PI
STEM	Science, Technology, Engineering and Mathematics
URM	Under-Represented Minority
US	United States
VSEE	Visiting Scientists, Engineers and Educators